Metro/T.T.C.

Downtown Rapid Transit Study

Report 2.01 **PROBLEMS AND ISSUES TO 2001**

Toronto Transit Commission

May 1984

Downtown
Rapid
Transit
Project

Metropolitan Planning Department
Metropolitan Roads & Traffic Department
Toronto Transit Commission

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June 26, 1984

TO: The Metropolitan Toronto Technical Transportation Planning Committee

FROM: D. J. Morton

RE: Downtown Rapid Transit Study

At its meeting of June 21, 1983 the Council of Metropolitan Toronto, in adopting Clause No. 1 in Joint Report No. 1, of The Transportation Committee and The Economic Development and Planning Committee, approved Terms of Reference for a Downtown Rapid Transit Line Feasibility Study.

The design for this study provided for two separate phases of study:

Phase 1 - Problem Definition
Phase 2 - Solution Development.

Phase 1 of the study was recently completed and I am pleased to submit Report 2.01, "Downtown Rapid Transit Problems and Issues to 2001" which summarizes the study findings with regard to future transportation needs into downtown; the capacity of the existing system; and the system deficiencies that are expected between now and the year 2001.

Based on these findings substantial growth in office employment is expected in the Metro Region through the next twenty years.

Due to a number of economic forces and the impact of deconcentration policies; the downtown is expected to attract a smaller share of this growth than it has in the past. However, the downtown share of this growth is still expected to cause serious congestion and delayed transit trips into the downtown, unless relief facilities are introduced. The findings in this report indicate that the relief required cannot be supplied through such measures as reduced headways on the Yonge Subway, increased capacity on surface transit or increased service on GO Rail Transit.

In submitting this report, I wish to acknowledge the assistance of the study participants from the Planning Branch and the Engineering and Construction Branch of the Toronto Transit Commission, the Metropolitan Toronto Planning Department, and the Metropolitan Toronto Roads and Traffic Department.

It is recommended that this report be circulated to the Area Municipal staff, and the Ontario Government, and those Boards, Commissions and Public Corporations affected by transportation and land use matters, for their information.

D J Martin

DJM/gmi

Project Manager

Encl.

DOWNTOWN RAPID TRANSIT REPORT NO. 2.01

PROBLEMS & ISSUES TO THE YEAR 2001

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DOWNTOWN RAPID TRANSIT REPORT 2.01
PROBLEMS AND ISSUES TO 2001
SUMMARY

BACKGROUND

The opening in 1954 of the Yonge Subway was the beginning of an almost continuous program of expansion of Toronto's rapid transit network over the past thirty years. Today there are 54.4 kilometres of rapid transit service operating in Metropolitan Toronto, providing rapid transit service to every borough and city of the Metropolitan area, that if built today would cost in excess of $2.4 billion dollars.

Through 1981 the TTC and Metro carried out the Metro/TTC Rapid Transit study to consider and review specific transit improvements for possible inclusion in the TTC Capital Works program, and to recommend to Metropolitan Council, if necessary, amendments to the Metropolitan Official Plan to accommodate the future expansion of transit facilities within Metropolitan Toronto. The Downtown Rapid Transit Study has been undertaken in response to recommendations of this Metro/TTC Rapid Transit Study.

This Downtown Rapid Transit Study report addresses the following five issues:

1. Future transportation needs.

   Will the demand for Downtown transit continue to grow over the next two decades as it has over the past two decades?

2. The existing subway capacity.

   What is the practical capacity of the Yonge-University Subway?

3. Surface transit options.

   Are there opportunities for improving the surface transit that could prove effective in meeting the short and intermediate term requirements of Downtown transit?

4. GO Transit options.

   What do GO Transit programs mean in terms of offering alternative services into downtown Toronto, and can GO Transit be considered an effective alternative?

5. The do-nothing option.

   How serious is the shortfall and what would be the effect of continuing to defer further transportation investment into Downtown?

FUTURE TRANSPORTATION NEEDS

The single most important factor influencing transportation policies for Metropolitan Toronto over the next two decades will be the demand for transportation into downtown generated by work trips to downtown offices. In view of the importance this estimate has for major decisions regarding future transit; and in view of the uncertainties in today's dynamic world, three separate methods have been used to forecast transit demand into the downtown through to year 2001. The methods used in the forecast have included a trend analysis, a demographic analysis, and transportation modelling.

In estimating the growth in downtown office employment between 1981 and 2001, Woods Gordon, a consultant to the study, drew the following conclusions:

1. The employment level in the Metro Region is expected to grow by 23%.

2. Office employment in the Metro Region is expected to grow by 32%. This faster growth rate in office employment reflects changes in the employment structure.

3. The proportion of Metro Region office space located in the downtown has fallen from 67% in 1967 to 57% in 1983. The decline in relative importance of downtown is expected to continue. Over the next twenty years downtown is expected to capture between 20% and 40% of office development in the Metro Region, compared to 46% over the past fifteen years.

On the basis of these conclusions regarding office growth in the Metro Region, and in consideration of ridership forecasts through trend analysis and transportation system modelling, the demand on the Yonge and University Subways was estimated to grow between 30% and 40% over the twenty year period between 1981 and 2001.

This compared with an 80% growth in the ridership in the twenty year period from 1961 to 1981.

EXISTING SUBWAY CAPACITY

130,000 passengers transfer from train to train on a typical week day at the Yonge-Bloor Station, and large dwell times result from the conflict between passengers getting off and passengers getting on trains at the same platform and through the same doors.

The Yonge Subway has operated over the past ten years at Level of Service E with a train frequency of 28 trains per hour, and delays in boarding and off-boarding at the Yonge-Bloor interchange station preclude the opportunity for more frequent train service as a measure for relieving overcrowding.

In 1974 the University Subway was carrying approximately 15,000 passengers per hour in the peak period, and had a residual capacity of about 19,000 pph. Since 1974 ridership has increased to about 24,000 passengers per hour and the residual capacity has been reduced to about 10,000 pph with the service operating at Level C.

Forecasts of increased ridership on the Yonge-University Subway into the downtown indicates that the Level of Service on both lines will be in the Level E Zone by the late 1980's, and be in the Level F Zone by the mid 1990's. At this Level of Service, delays, stoppage in tunnels, and service breakdowns are expected to occur on a regular basis on both subway lines, and transfer capacity at both St. George and Yonge-Bloor Station will become critical.

THE SURFACE TRANSIT OPTIONS

Existing surface transit into Downtown consists of four streetcar lines and three bus and one trolley line. The four streetcar services operating on King, Queen, Dundas and Carlton carry a total of about 7,500 passengers in the peak hour of travel into Downtown. The four bus and trolley services operating on Church, Bay, Avenue Road and Spadina carrying about 5,000 passengers into Downtown during the peak hour. These routes do not effectively serve any of the areas forecast to

be major contributors to the future increase in downtown work trips; trips that will originate in the suburbs with a destination in the Financial District.

Recent proposals for light rail transit service have included Parliament, Bay and Spadina.

Recent proposals for a downtown express bus service are for a service on Sherbourne and on Don Mills Road.

Of the five options that have been, and are under consideration, only the Sherbourne and Don Mills express bus proposals provide relief to both the Yonge line into the downtown and the Danforth line from the east. The Sherbourne express bus proposal has been supported by staff of the TTC, however negative impact on existing street uses has delayed any agreement on dedication of right-of-way for this service. The Don Mills express bus proposal is now being studied by staff of the TTC. Both of these surface transit options should be further pursued as measures that may relieve overcrowding conditions on the Yonge and University Subways on a short term basis.

THE GO TRANSIT OPTION

The Go Rail Transit service into downtown now serves approximately 17,500 trips during the peak hour of service. In the 20 year period between 1981 and 2001, GO Rail is expected to carry 40% of all new transit trips into the downtown and increase ridership by approximately 80% to 32,000 passengers per hour during the peak a.m. period.

This increase in demand is expected to require service increases on the GO Rail lines that will include ten minute headways on the Lakeshore West and Lakeshore East, and longer and more frequent bi-level trains on the Milton and Richmond Hill Lines.

The Lakeshore East rail service includes a stop at the Danforth Station, which is located approximately 300 metres south of Main Station on the Danforth Subway. This study considered the practicality of diverting some of the Danforth Subway trips to the GO Lakeshore East line as a relief measure to overcrowding on the

Yonge-University Subway. While an upgraded rail service would offer greater capacity into the downtown, the weakness of the connection at Main Station (long transfer distance and located too far east of peak loading conditions), and the poor accessibility to the downtown office locations (30% of passengers may require a transfer back to TTC), limit the opportunities for diverting downtown trips from the Danforth Subway to the Lakeshore East GO Rail service.

THE DO NOTHING OPTION

The next decade is expected to be a time of transition with many structural changes in employment in the Metro Region. These changes are expected to result in an increased proportion of office employment throughout the Metro Region, and despite a declining growth rate in the overall labour force, a strong job market in office employment is expected to continue.

Although more of this office employment is expected to locate outside the downtown, a strong growth in downtown office employment is forecast to continue. The existing vacant downtown office space and space presently under construction, is a visible indication of the potential for employment growth in downtown offices. This space alone could add 35,000 new employees downtown, and 10,000 new riders on the subway during the peak hour of travel.

The issues in transit are a question of the quality of accessibility that should be maintained into the downtown. Ten years ago the Yonge and University Subways operated with a residual capacity of about 20,000 pph during the peak hour of operation. Approximately one half of this residual capacity has been used to meet the growth in demand in the past decade and, assuming that most additional ridership will choose the University Subway, the remaining residual capacity may meet demand for up to the next ten years. Beyond that, if a new rapid transit line is not built the quality of accessibility into downtown will show marked deterioration as work trips into downtown either shift to surface routes, to private cars, or spread over a greater peak travel period.

The second phase of this study will consider alignment options for a rapid transit line through the downtown, ranging from Queen Street in the north to the proposed Esplanade West in the south. The line as proposed would connect the downtown

core to the Danforth Subway at either Pape or Donlands Station providing an alternative rapid transit routing into the downtown. The purpose of this line would be to divert some of the transfer traffic from Yonge-Bloor Station to Pape or Donlands Station; to reduce demand on the Yonge Subway south of Bloor, and to reduce demand on the Danforth Subway east of Yonge. Exhibit 8.1 illustrates the options being studied and that should be considered for implementation if accessibility into downtown is to be maintained.

This study has examined the question of growth in transportation needs into the downtown using three different methods, and has drawn fairly consistent conclusions from all three methods. While the timing may vary with economic conditions and business locational decisions, there is solid evidence of a growing need to construct more rapid transit into the downtown. Surface transit improvements and increased patronage on the GO Rail Service may offer limited relief from overcrowding and an improvement in the level of service over a limited period of time. However service capacity shortfalls apppear most probable by the early to mid 1990's if a relief line is not implemented over the next seven to ten years.

SECTION 1 - BACKGROUND

On the 30th of March, 1954, four and a half years after start of construction the TTC opened the Yonge Subway to passenger revenue service. This 7.4 kilometre line costing $67 million offered rapid transit service on Toronto's busiest transit route between Front Street and Eglinton Avenue. The opening in 1954 was the beginning of an almost continuous program of expansion of Toronto's rapid transit network over the past thirty years. Today there are 54.4 kilometres of rapid transit service operating in Metropolitan Toronto, providing rapid transit service to every borough and city of the Metropolitan area. If this network was built today it would cost in excess of $2.4 billion dollars, and the 7.4 kilometre Yonge Street line alone would cost over $430 million dollars.

On the 28th day of February 1963 the Toronto Transit Commission opened the University Subway to passenger service. This 3.7 km line, costing $40 million extended the Yonge Subway from Union Station north on University Avenue to the Bloor-Danforth. This was a first stage in expansion of the Toronto Subway system which included the opening, three years later, of the Bloor-Danforth Subway to provide service on an east-west line from Woodbine in the east to Keele Street in the west. This combined Bloor-Danforth and University Avenue expansion of the subway system involved the construction of twenty-four subway stations over a route distance of 16.7 km. In 1963, the year that the University Subway was opened, the TTC carried 271 million riders on its system, and in that year office space in downtown Toronto totalled 2.1 million square metres.

The construction of this line and expansion of the subway system, was a catalyst to further downtown development, and in 1969 the TD Centre with an office space of 330,000 square metres was opened, adding work space in the Downtown for over 10,000 employees. Again, three years later, in 1972 Commerce Court opened with 254,000 square metres of floor space, and much of Toronto was taking pride in being the boomtown of North America.

But also in 1972, a municipal election occurred which brought a change in attitude towards this construction boom that was occurring in Downtown Toronto. A new mayor and nine new aldermen called for a pause while new policies could be

developed that would encourage a more balanced form of development in the central core of the City of Toronto. Politicians and planners at the time were looking for measures to restrain growth in the Downtown, measures that would promote a deconcentration of commercial and institutional uses, measures that would preserve historical sites and add housing, measures that in the words of one planner, "Would make provision for a twenty-four hour activity cycle in the core".

In 1973, in response to the concerns of the new council the City of Toronto passed the forty-five foot holding bylaw. This bylaw was intended as a temporary measure until new provisions could be drafted for inclusion in a revised Official Plan for the City of Toronto. In 1975 Cabinet of the Ontario Government declared the forty-five foot bylaw illegal and by October of 1975 the City had published planning studies for a new Official Plan. These planning studies became the basis for the existing Official Plan of the City of Toronto

In 1975 the TTC ridership was now up to 357.6 million and by the end of 1975 the office space in Downtown Toronto had grown to 4.3 million square metres.

The planning study published in October of 1975 by the Planning Board of the City of Toronto was titled "The Central Area Plan Review - Proposals Report - Area Plan for Downtown". Background reports to this plan estimated that the realistic capacity of the transportation facilities existing at that time into Downtown was adequate to service a built office space of up to 6.55 million square metres, and proposed that this limiting capacity of the existing transportation facility be adopted as a cap for all future office development in the Central Core.

However, this planning proposal by the Planning Board of the City, was countering a twenty year trend for Downtown Toronto. At the time that the Planning Report was published, the Central Core already contained 4.1 million square metres and had, either under construction or commitments for another 1.1 million square metres, leaving a residual capacity of only 1.3 million square metres of unaccounted development rights for future projects. Some of these commitments included the Royal Bank Plaza opened in 1977 with 189,000 square metres, and First Canadian Place opened in 1979 with 314,000 square metres. These and other projects were accommodated, and when the plan was finally approved at the

Ontario Municipal Board level the original intent to limit Central Core office space to 6.55 million square metres had grown with the control in the final plan set at 8.2 million square metres, or 25% greater than the estimated transportation capacity into the Downtown.

The City of Toronto Official Plan adopted in 1976, and approved by the Ontario Municipal Board in 1978, set out six major planning objectives:

1. The deconcentration of office employment.
2. The retention of low rise neighbourhoods in the Central Area.
3. The expansion of the residential function in the Central Area.
4. The conservation of historic buildings.
5. An increase in parks and recreation space in the central core.
6. The avoidance of unacceptable levels of congestion on the transportation system.

Towards controlling the Downtown office development, and towards deconcentration of office employment, the Plan provided control figures for the rate of absorption of office space in the central core. These control figures established the objective that the rates of growth in office space in the central core, including office space existing and under construction be maintained below the following figures:

5.8 million square metres by 1981
6.4 million square metres by 1986
7.0 million square metres by 1991.

In 1981 the actual office space built and under construction in the Central Core was 5.3 million square metres, and therefore, below the control limit established in the Official Plan. In the 1981 Quinquennial Review, the City of Toronto Planning and Development Department recognized that the continuing office development in the central core was contributing to heavy crowding being experienced on the Yonge line of the subway system south of Bloor Street over relatively short periods of time during the rush hour.

The Quinquennial Review noted that there may be a number of alternative means of achieving a better utilization of subway lines through operation of shorter

headways between trains, through improved levels of service on street car or LRT lines into Downtown, through improved services on the GO Transit, or through the use of better bus transit into the Downtown core; and recommended that these alternatives to improving transit service into the central core be the subject of a future study.

Through 1981 the TTC and Metro carried out the Metro/TTC Rapid Transit study to consider and review specific transit improvements for possible inclusion in the TTC Capital Works program, and to recommend to Metropolitan Council, if necessary, amendments to the Metropolitan Official Plan to accommodate the future expansion of transit facilities within Metropolitan Toronto. This study concluded with six recommendations:

1. A rapid transit 'relief' line from Union Station to the Danforth Subway in the vicinity of the Greenwood yards and an east-west line along Sheppard Avenue from the Yonge Subway to the Scarborough Town Centre be approved in principle;
2. The Technical Transportation Planning Committee be authorized to undertake feasibility studies on the aforementioned two lines; the study of the 'relief' line to be combined with a feasibility study of the proposed Waterfront line from Union Station to Exhibition Place which would include an assessment of options for extending the line north-westerly to the Bloor Subway;
3. The Toronto Transit Commission be:
   a) authorized to prepare a plan for the implementation of surface transit improvements to and within the Central Area, such plan to identify any required transit priority measures, and
   b) requested to report on the feasibility of implementing various measures to increase the capacity of the existing subway system;
4. Metropolitan Planning staff, in consultation with City of Toronto and Toronto Transit Commission staff, be authorized to develop a program to monitor employment growth and development proposals in the Central Area and to determine their effect on the transportation system;
5. The Commissioner of Planning be requested to report as soon as possible on the content and timing of amendments to the Metropolitan

Official Plan and the requirements of the Environmental Assessment Act, in conjunction with the aforementioned recommendations; and

6. The Technical Transportation Planning Committee initiate discussions with officials of the Province and the Region of Peel with respect to developing a strategy for coping with future travel across the west Metro boundary.

At a meeting on June 16, 1982 the Council of the Municipality of Metropolitan Toronto referred the Metro/TTC Rapid Transit Study Report to the area municipalities for comment, and following receipt of these comments, in June 1983, approved terms of reference for the Downtown Rapid Transit and the Eglinton Rapid Transit Studies.

SECTION 2 - ISSUES

The Downtown Rapid Transit Study has been undertaken in response to recommendations one and two of the Metro/TTC Rapid Transit Study concluded in May of 1982. The starting point in this study has been to identify the issues regarding Downtown Transit and the requirements for increased service into Downtown Toronto. Over the past decade there has been a history of divergent opinions and a history of failures to reach concensus positions regarding policies, regarding remedies or even regarding facts bearing upon Downtown transportation needs. Five issues for which a concensus is needed and which are addressed in this study are:

1. Future transportation needs.
   Will the demand for Downtown transit continue to grow over the next two decades as it has over the past two decades?
2. The existing subway capacity.
   What is the real capacity of the Yonge-University Subway?
3. Surface transit options.
   Are there opportunities for improving the surface transit that could prove effective in meeting the short and intermediate term requirements of Downtown transit?
4. GO Transit options.
   What do GO Transit expansion programs mean in terms of offering alternative services into Downtown Toronto, and can GO Transit be considered an effective alternative?
5. The do-nothing option.
   How serious is the shortfall and what would be the effect of continuing to defer further transportation investment into Downtown?

Future Transportation Needs

The demand for Downtown transportation is very much related to Downtown office employment. The existing transportation system is used to its fullest capacity for only about four hours each day, Monday through Friday. During these four hours the work trip to Downtown office locations is the single major generator of traffic and one of the major issue being faced by transportation planners in the Metropolitan Toronto area.

The level of office employment is in turn directly related to the amount of office space that is located, or choses in the future to be located in the Central Core of the City of Toronto. Forecasts of future office development and future downtown office employment are uncertain and dependent upon many factors. A policy of encouraging deconcentration of office employment within Metropolitan Toronto, and the changing structure to Canada's economy are factors that lead to this uncertainty in predicting the future growth of office space, and hence the future growth of employment in the Central Core area. The future transportation needs of Downtown Toronto are further discussed in Section 3.

The Existing Subway Capacity

In 1975 Tom E. Parkinson, in a report to the City of Toronto, undertook estimates of the capacity of the existing transportation system serving central Toronto, including the subway, and in 1977 a study by the Urban Transportation Development Corporation discussed the possibility of changing the signal system on the Yonge line to accommodate a minimum headway of one minute and thirty seconds. This type of improvement which would increase the number of trains operating during rush hour from the present twenty-eight trains per hour up to forty trains per hour, would increase the capacity of the existing facility by significant volumes and for some period into the future solve problems of congestion and overcrowding on the existing service.

Can the number of trains operating in the Yonge-University Subway be increased on a practical basis, or is the TTC operating this line at its practical limit? The limitations on the capacity of the Bloor-Danforth Subway have been studied in detail and are discussed in Section 4.

Surface Transit Improvement Potential

The TTC operates four streetcar lines, one trolley route and three bus routes into downtown. These services could be upgraded or supplemented with new express services that may offer a surface relief option. Can an LRT service introduced on Spadina, Bay or Parliament ease capacity problems being experienced at the Yonge-Bloor station and on the Yonge Subway south of Bloor Street? Or could express bus services directly from the suburbs into Downtown defer or further delay the requirements for improvements in rapid transit service, and delay the

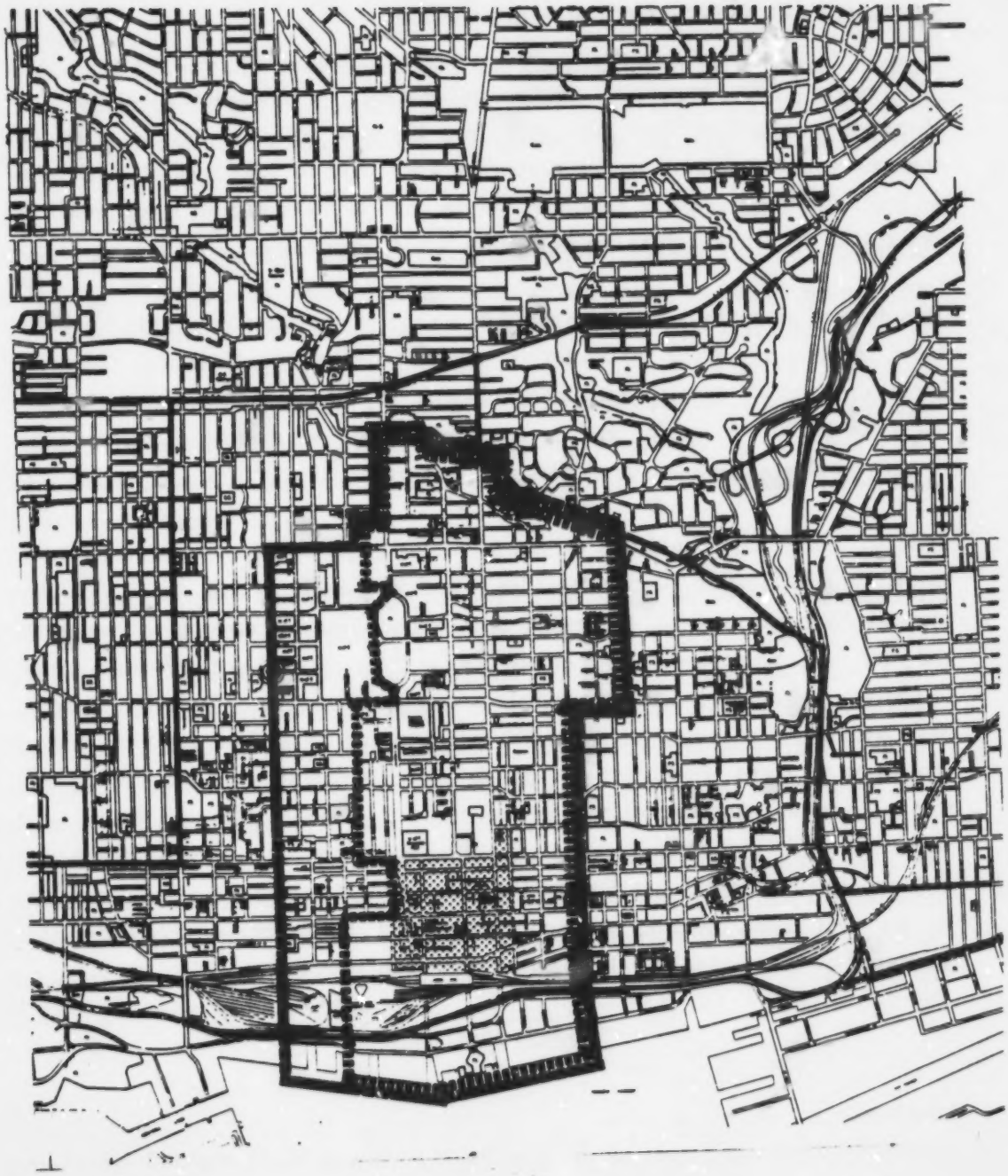
need to invest in rapid transit service in the Downtown? These questions of potential improvements to the surface operations of the TTC have often been raised by advocates of incremental measures for gradual improvement to Downtown transit and are examined in Section 6.

GO Transit options

In 1982, the Ontario Government announced a GO ALRT program that proposes improved GO services along the Lakeshore. Can this service, or an enhanced GO Rail service, provide an alternative to a rapid transit relief line within the TTC network? Section 6 of this report discusses this issue and identifies the opportunities that appear to exist for upgrading or improving GO service into Downtown.

Do Nothing Options

Finally, there is the question of what happens if we chose the do-nothing option. How serious would the shortfall and traffic congestion be? What complementary land use policies would be required, and what would be the impact on office space, office growth and development in the Downtown? Is a continuation of the do-nothing option necessary in assuring success of proposed Metro subcentres? Future office employment and expected locational distribution within the Metro Region are discussed in Section 3, together with the resulting requirements for transportation.



AREAS BOUNDARY MAP
EXHIBIT 2.1

SECTION 3 - TRANSPORTATION NEEDS TO 2001

The single most important factor influencing transportation policies for Metropolitan Toronto over the next two decades will be the demand for transportation into downtown generated by work trips to downtown offices. The estimate for this demand is pivotal in the decision to make capital investments in new transit facilities such as the Downtown Rapid Transit line.

This demand estimate is being prepared in a time of considerable uncertainty. We face uncertainty about potential structural changes in Canada's economy; uncertainty about levels of unemployment in the Canadian economy; and uncertainties of the impact that deconcentration policies may have on locational decisions by developers and employers of office staff.

In view of the importance this estimate has for major decisions regarding future transit; and in view of the uncertainties in today's dynamic world, three separate methods have been used to forecast transit demand into the downtown through to the year 2001 and beyond. The methods used in the forecast have included a trend analysis, a demographic analysis, and transportation modelling. The trend analysis has consisted of a review of historical ridership and development trends, and a projection of these trends into the future. The demographic analysis by Woods Gordon involved a forecast of population for the Metropolitan Toronto Region and an estimate of the percentage of this population that will work in downtown offices. Finally, the third method used to develop the forecast for demand through to the year 2001 involved the application of a computerized travel demand developed by the staff of the Metropolitan Planning Department.

TREND ANALYSIS

Line Loads

Service on the Yonge Street subway line began on March 30, 1954 amidst a general decrease in ridership. The decrease occurred during a time when industrial jobs were moving away from downtown Toronto to the automobile oriented suburbs. Ridership started to increase again in the early 1960's as newly constructed office towers increased the amount of service-related employment in the downtown. The

University Subway line opened February 28, 1963, followed by even more office tower construction and accelerating growth in TTC ridership. The construction of the Yonge-University Subway system is credited with initiating the construction boom of the sixties.[1]

Over the 17 year period since opening of the Bloor-Danforth Subway from 1966-1983, peak hour subway ridership into downtown has grown by 34,000 from 53,200 to 87,200. Annually, the average increase has been 2.95% (compounded).

Changes in the economy have appeared to be a major factor causing a cyclical variation of about 6% above and below this medium growth trend. This fluctuation of subway ridership with the unemployment rate in Metropolitan Toronto is illustrated in Exhibit 3.1.

Peak point ridership on the Yonge and University lines reached record levels of 24,900 pph on the University line in 1980 and 35,200 pph on the Yonge line in 1981. Peak point subway ridership then decreased during the years 1982 and 1983, coinciding with the economic recession. Over the 1966 to 1974 period, a.m. peak hour ridership on the Yonge Subway south of Bloor increased on average by about 400 pph per year. Since 1975, ridership on the Yonge Subway has experienced load fluctuations but the medium peak point ridership has been relatively unchanged over the past ten years. This levelling of ridership is considered to be the result of capacity constraints on the Yonge line and provides an indication of the maximum passenger loadings that can be carried on this line. Increasing patronage on other subway lines provides evidence that more trips into downtown would be made on the Yonge Subway if the capacity were available.

1. A pictorial review of development along subway corridors is presented in the TTC brochure Metropolitan Toronto; The Transit Development Connection, December 1983.

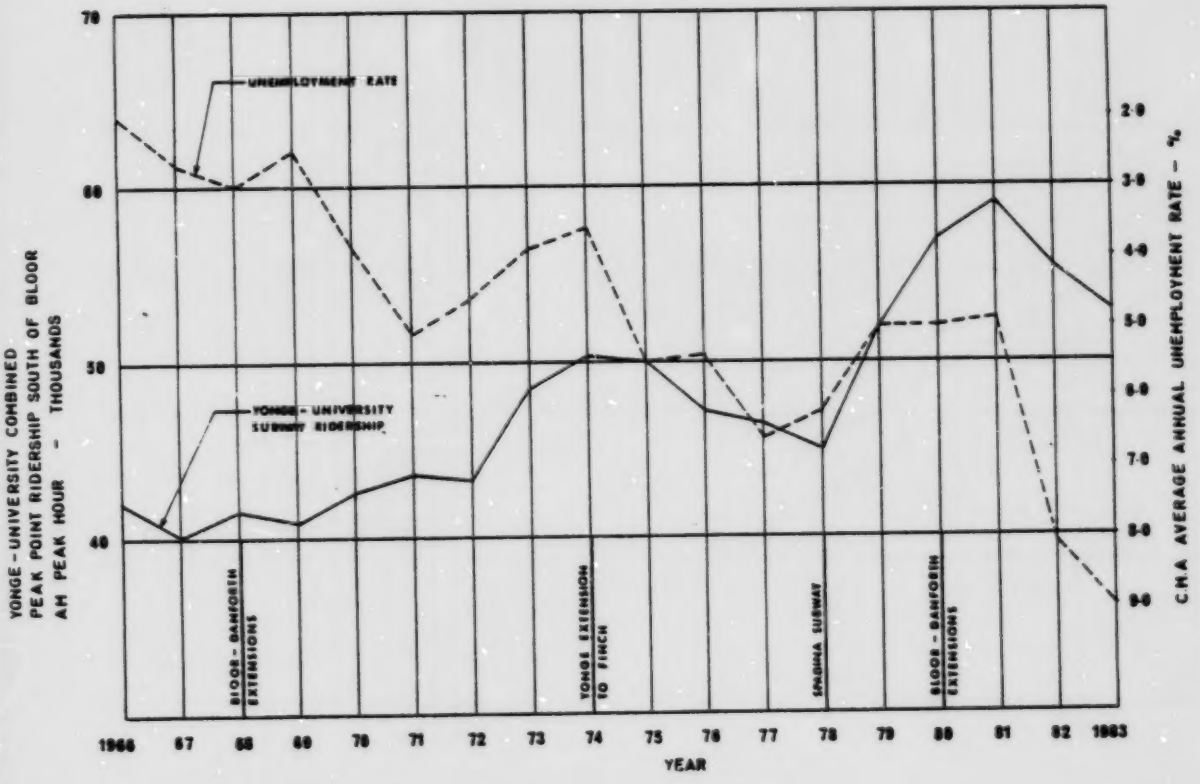
Through the period between 1966 and 1983, ridership on the University Subway has increased fairly uniformly at an average rate of 900 pph per year. The combined ridership trend for peak hour demand on the Yonge-University Subway is shown in Exhibit 3.2. In projecting past ridership trends to forecast future demand it is necessary to make allowances for economic cycles that affect downtown employment and downtown peak period ridership.

On Exhibit 3.2 this cyclical variation is illustrated as a band. This band has been drawn to represent the mid 80% of demand variations occurring as a result of historical trends in these economic cycles. This trend analysis of the combined ridership of the Yonge-University Subway indicates serious overcrowding conditions on both the Yonge and University Subways by the mid 1990's.

In the 1974-1975 period when ridership on the Yonge line levelled due to capacity constraints, the University Subway was operating with a residual capacity of about 20,000 pph. In the past ten years approximately one-half of the residual capacity has been taken up through growing demand into the downtown. While actual demand will vary with economic conditions, this remaining residual capacity should meet demand to about the early to mid 1990's.

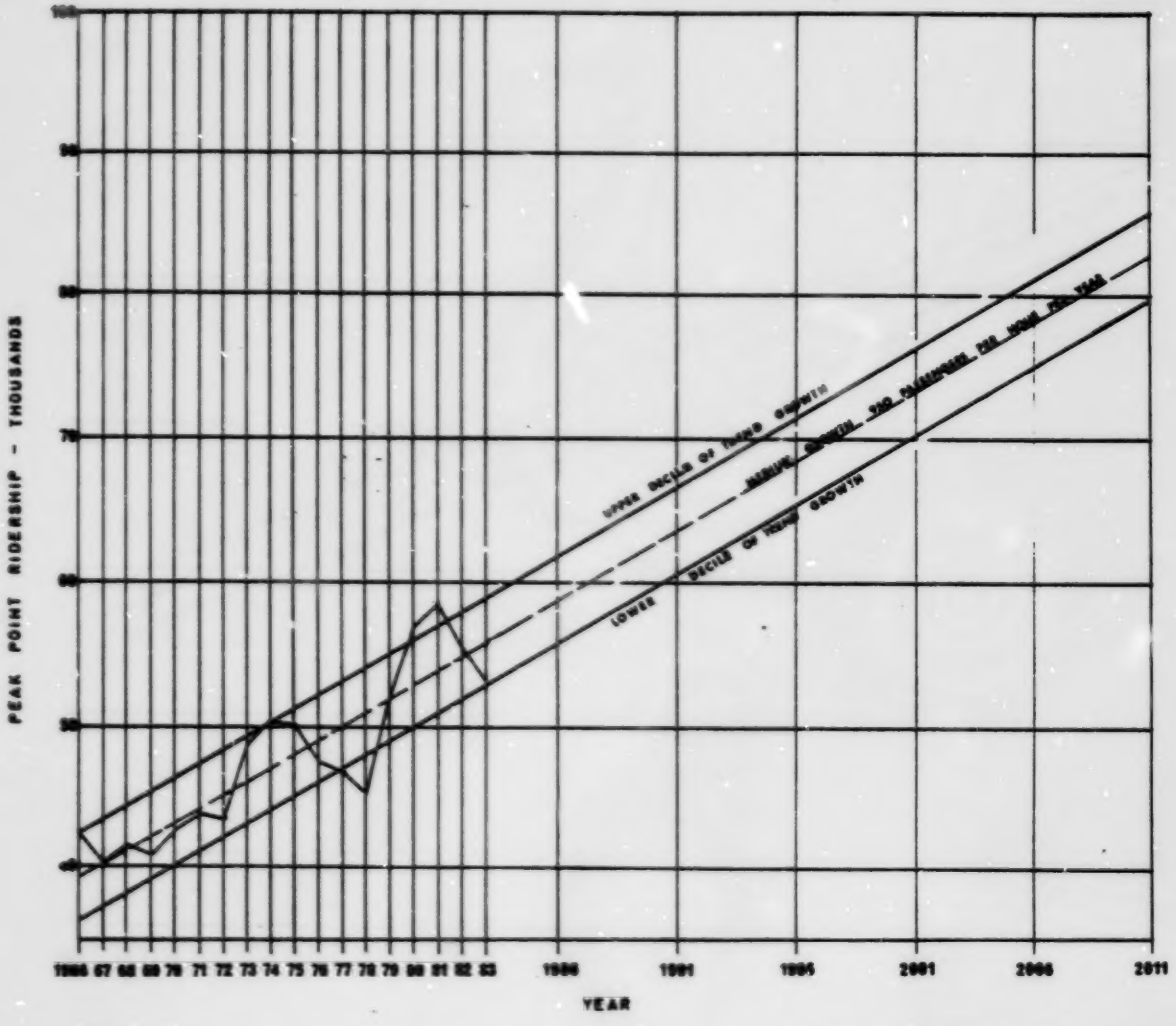
The maximum peak ridership on the Bloor-Danforth Subway was 25,700 west of St. George Station in 1982 and 28,600 east of Yonge Station in 1980. The ridership trends on the Bloor-Danforth subway east of Yonge and west of St. George are illustrated in Exhibits 3.3 and 3.4 On the basis of trend analysis, ridership on the Danforth Subway is growing at a rate that indicates a potential overcrowding on the line by the mid 1990's.

On the basis of this trend analysis the capacity limitations of the Danforth Subway between Yonge and Broadview act to constrain growth potential in the downtown in much the same way as the Yonge-University Subway after about the mid 90's. The significance of the analysis is the fact that on a long term basis, any relief facility to the Yonge Subway should also provide relief to the Danforth Subway from east of the Broadview Station.



INFLUENCE OF
ECONOMIC CYCLES ON
TRANSIT RIDERSHIP

EXHIBIT 3.1

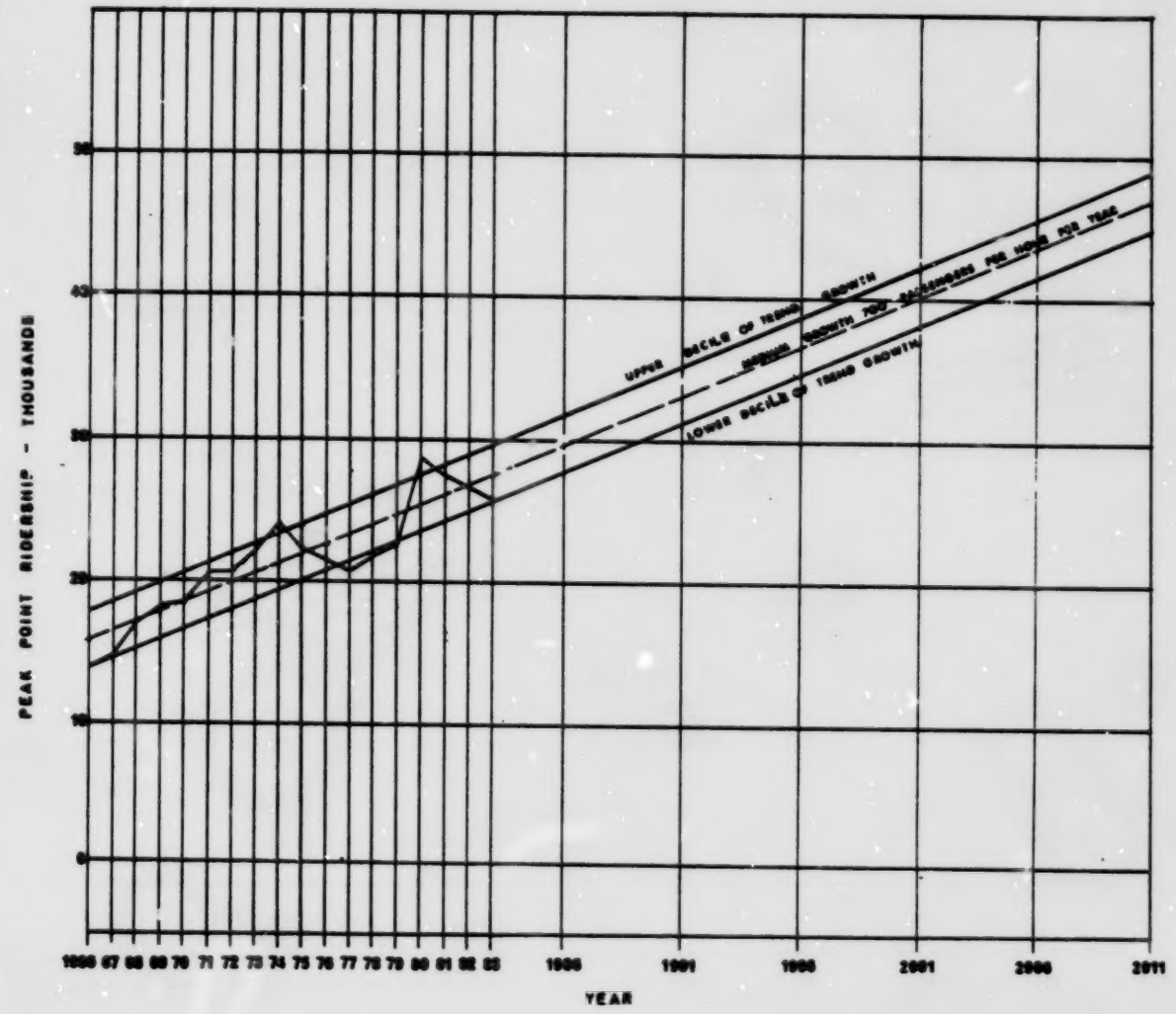


NOTES

1. PEAK POINT RIDERSHIP IS THE AVERAGE OF THREE HIGHEST COUNTS IN THAT YEAR

YONGE UNIVERSITY SUBWAY
PEAK POINT RIDERSHIP
SOUTH OF BLOOR
A.M. MAXIMUM HOUR

EXHIBIT 3.2

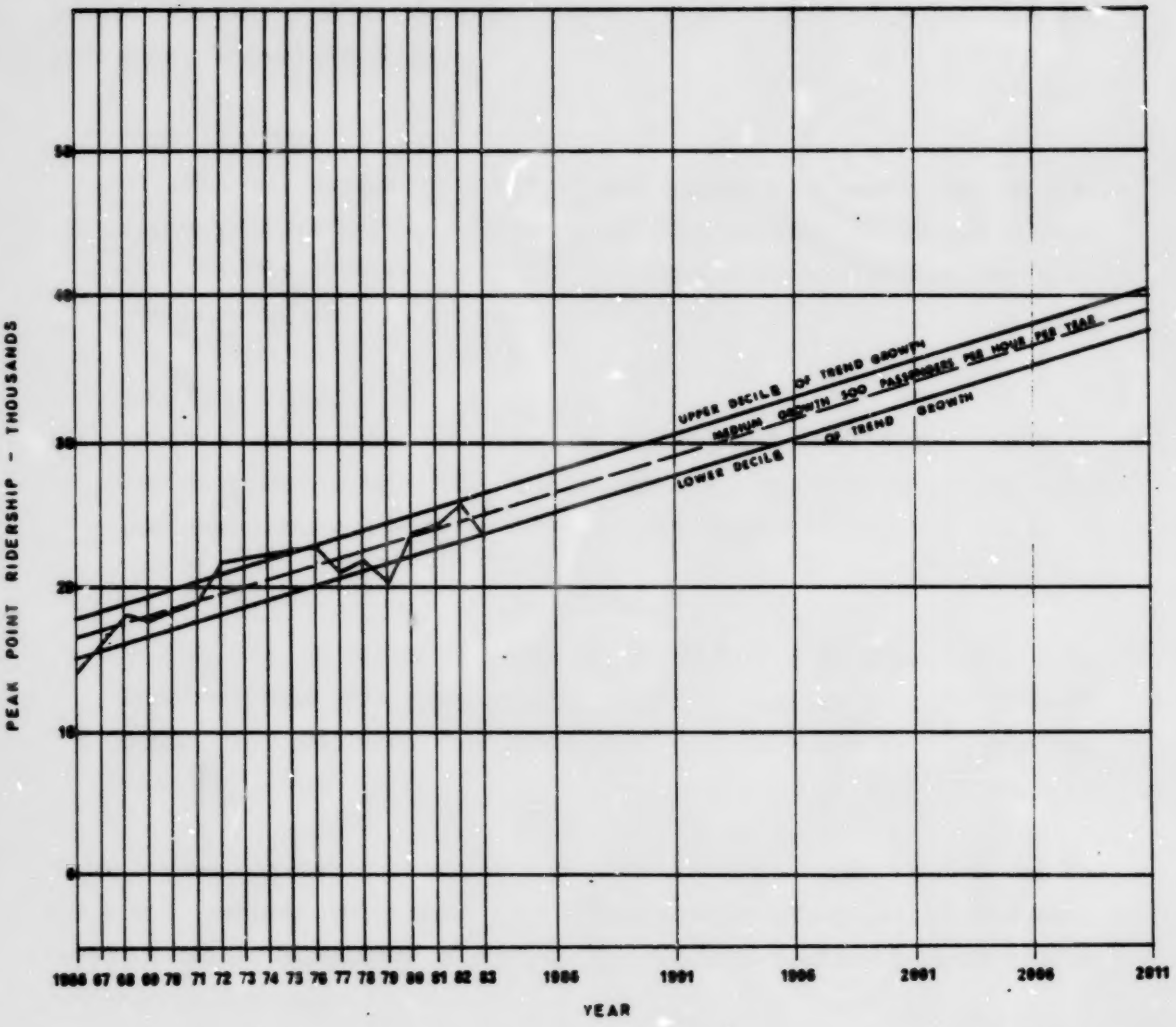


NOTES

1. PEAK POINT RIDERSHIP IS THE AVERAGE OF THOSE HIGHEST COUNTS IN THAT YEAR

BLOOR DANFORTH SUBWAY
PEAK POINT RIDERSHIP
EAST OF YONGE
A.M. MAXIMUM HOUR

EXHIBIT 3.3



NOTES

1. PEAK POINT RIDERSHIP IS THE AVERAGE OF THREE HIGHEST COUNTS IN THAT YEAR

BLOOR SUBWAY
PEAK POINT RIDERSHIP
WEST OF ST. GEORGE
A.M. MAXIMUM HOUR

EXHIBIT 3.4

Station Usage

During the months of January and February, the TTC conduct an annual count of subway station usage. Each of the 58 stations in the system is counted once and together, all of the counts are considered to represent one full day of operation on a normal weekday. These station counts downtown provide a further check on growth of transit trips into downtown and the relationship of the growth with the growth of downtown office space.

KING STATION

In 1983, the number of subway riders leaving King station during that station's busiest hour (8:15-9:15 a.m.) was approximately 11,500. On average over the 1966-83 period, A.M. Maximum Hour counts have been increasing by approximately 120 trips per year.

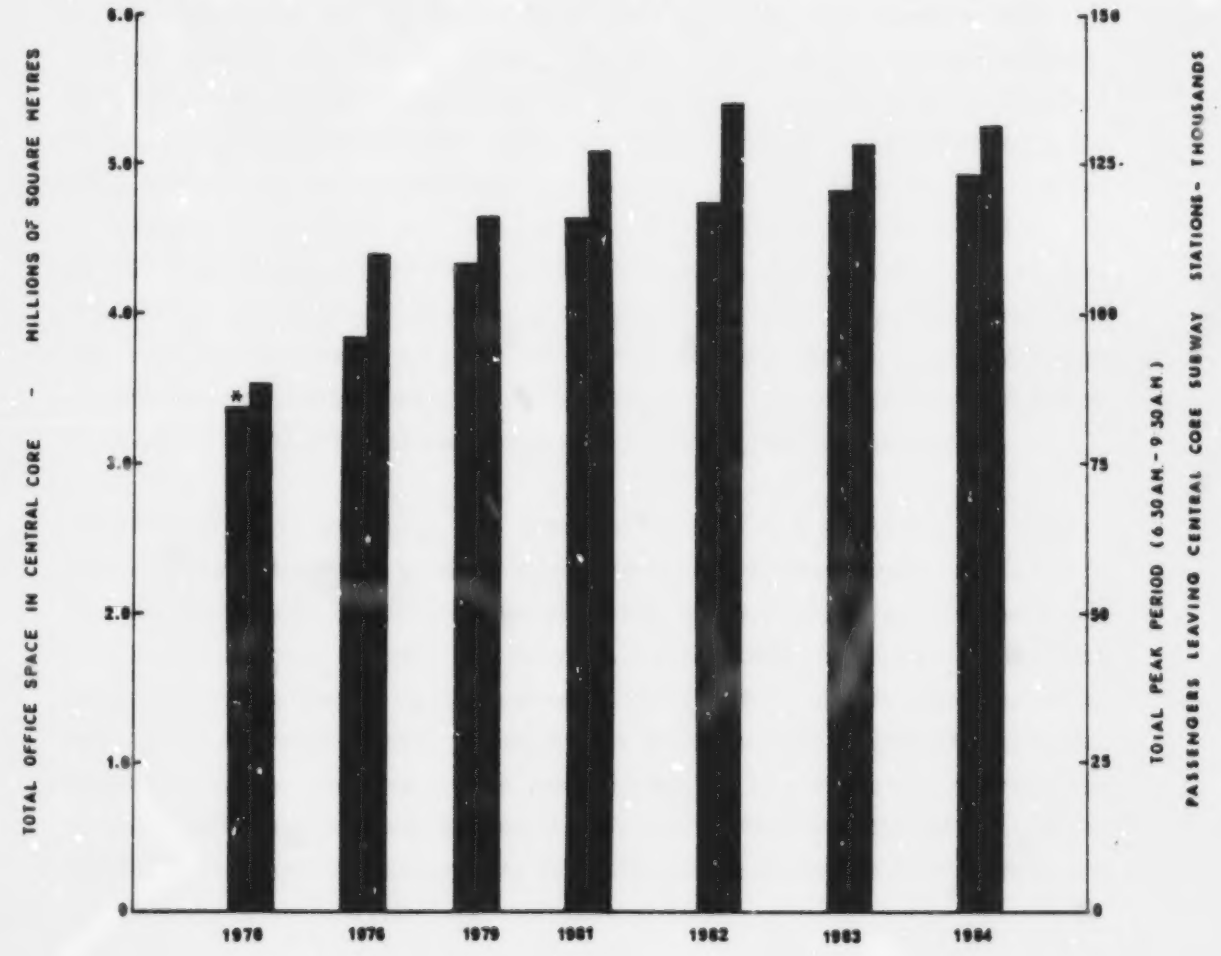
UNION STATION

In 1983, the number of riders leaving Union Station during the A.M. Maximum Hour was 6,000. On average over the 1966-83 period, A.M. Maximum Hour have been increasing by 190 trips per year.

ST. ANDREW STATION

In 1983, the number of riders leaving St. Andrew Station during the A.M. Maximum Hour was approximately 5,000. On average over the 1966-83 period, A.M. Maximum Hour counts have been increasing by 170 trips per year.

There has been an historical relationship in the downtown between subway station usage and downtown office space that is illustrated in Exhibit 3.5. This exhibit demonstrates the dependence of new developments on the subway for work trips to new leased office space.



OCCUPIED OFFICE SPACE – SOURCE - CITY OF TORONTO PLANNING DEPT CITY MONITOR

STATION USAGE – SOURCE - T.T.C.

* ESTIMATED USING JAN. 1 1976 BASE LESS A. E. LEPAGE ANNUAL ABSORPTION FOR THE YEARS 1976 - 1975

HISTORICAL RELATIONSHIP OF CENTRAL CORE OFFICE SPACE VS SUBWAY STATION USAGE

EXHIBIT 3.5

Central Core Office Development

The absorportion rate of office space in the Central Core and the rest of the Metro Region over the past twenty years, is illustrated in Exhibit 3.6. This exhibit demonstrates both a stable growth in the Central Core and a growing market share by the rest of the Metro Region. The Central Core has experienced a relatively constant growth rate over the twenty year period of about 135,000 square metres annually, while the rest of the region has grown from an annual absorption rate of 75,000 square metres during the 1960's to 140,000 in the '70's and to 240,000 in the early 1980's. This increased growth of office space outside downtown has resulted in a decline in the downtown share of total office space from 67% in 1967 to 57% in 1983. The medium growth rate of 135,000 square metres in the Central Core indicates an annual growth in downtown office employment of approximately 5,000 office exployees. Exhibit 3.7 graphically indicates this growth of office space with an indication of review limits set out by the City of Toronto Official Plan, and an estimate by T. Parkinson of the transportation system capacity constraints.

The report by T. Parkinson was prepared in 1975 and estimates the residual capacity of the downtown transportation system at that time. In the calculation of residual capacity T. Parkinson assumed a 1975 ridership that was somewhat lower than actual surveyed ridership for the year, and as a result produced a higher than actual residual capacity for the subway. The Parkinson report also assumed an increase in ridership on the surface transit as a result of residential population growth in the service area of the surface transit. In the interim, ridership has actually fallen rather than increased. The 95% Parkinson Estimate Limit on Exhibit 3.7 reflects the approximate effect of these assumptions in overestimating the capacity of the downtown transportation system.

Exhibit 3.8 and 3.9 illustrate the variation in vacancy rate in downtown with economic cycles over the past eight years and the distribution of space existing and proposed for the Central Core. It is of interest to note that approximately 900,000 square metres of space was either vacant or under construction as of January 1, 1983. This represents sufficient office space to accommodate up to 35,000 additional downtown office employees. At historical rates of absorption this space represents six to seven years of market demand for the downtown.

EXHIBIT 3.6

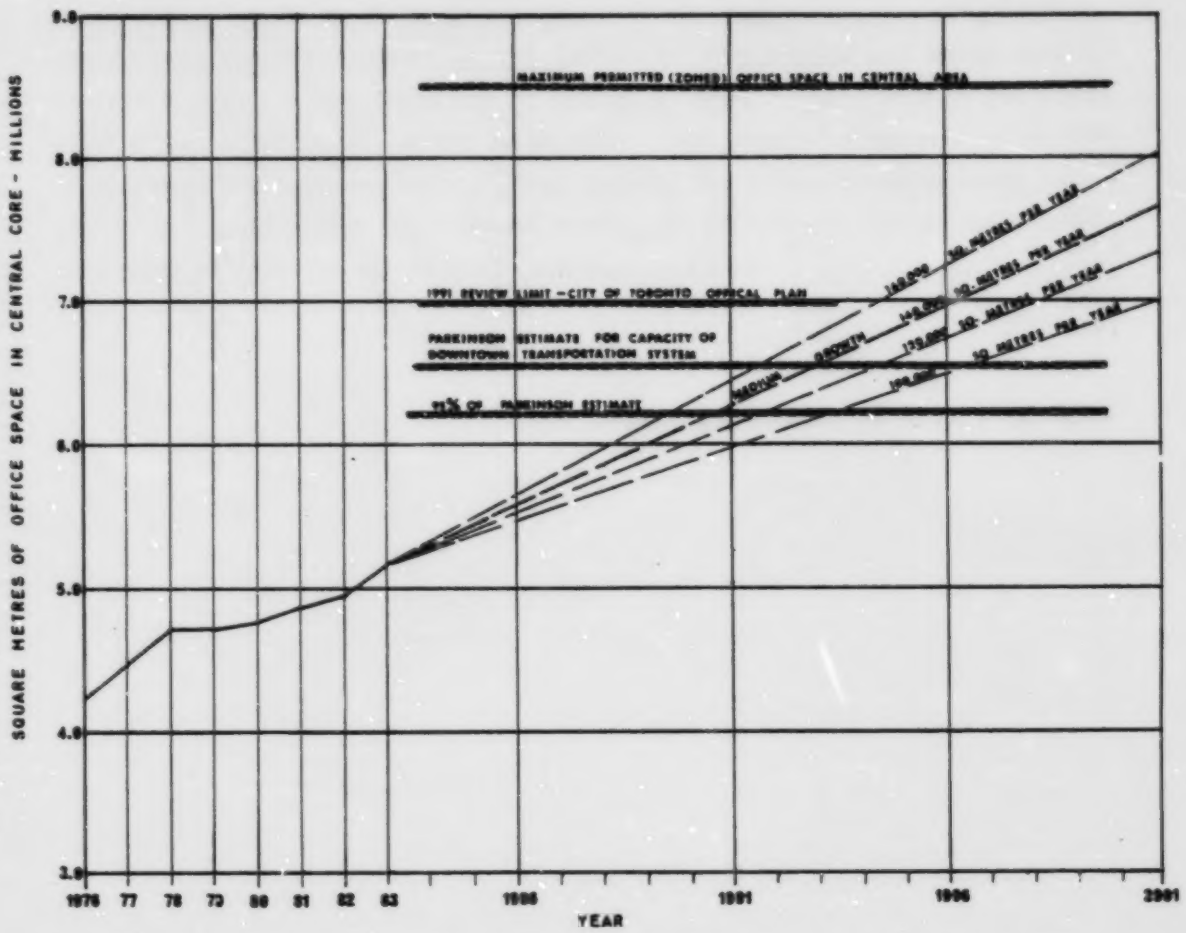
ABSORPTION OF OFFICE SPACE

1964-1983

Annual Absorption (000's of Sq. M)

Year	Core	Rest of Region	Total Region
1964	27	91	118
1965	72	90	162
1966	290	1	291
1967	85	115	200
1968	116	44	160
1969	152	112	264
1970	40	76	116
1971	158	61	219
1972	156	92	248
1973	150	172	322
1974	167	95	262
1975	217	109	326
1976	229	101	330
1977	55	108	162
1978	94	151	245
1979	232	424	656
1980	132	259	391
1981	190	399	589
1982	28	129	157
1983	135	190	325

SOURCE: City of Toronto, Office Monitor 1984



NOTES:

1. ANNUAL ABSORPTION RATE OF OFFICE SPACE IS BASED ON A.E. LEPAGE DATA

2. HISTORICAL ABSORPTION RATE FOR THE DOWNTOWN CORE IS:

30 YEAR AVERAGE	136 000 sq. metres
10 YEAR AVERAGE	148 000 sq. metres
5 YEAR AVERAGE	145 000 sq. metres

3. DOWNTOWN TRANSPORTATION SYSTEM CAPACITY IS BASED ON CITY OF TORONTO CENTRAL AREA PLAN BACKGROUND REPORT BY T. PARKINSON.

RATE OF GROWTH OF OFFICE SPACE IN CENTRAL CORE .

EXHIBIT 3.7

EXHIBIT 3.8

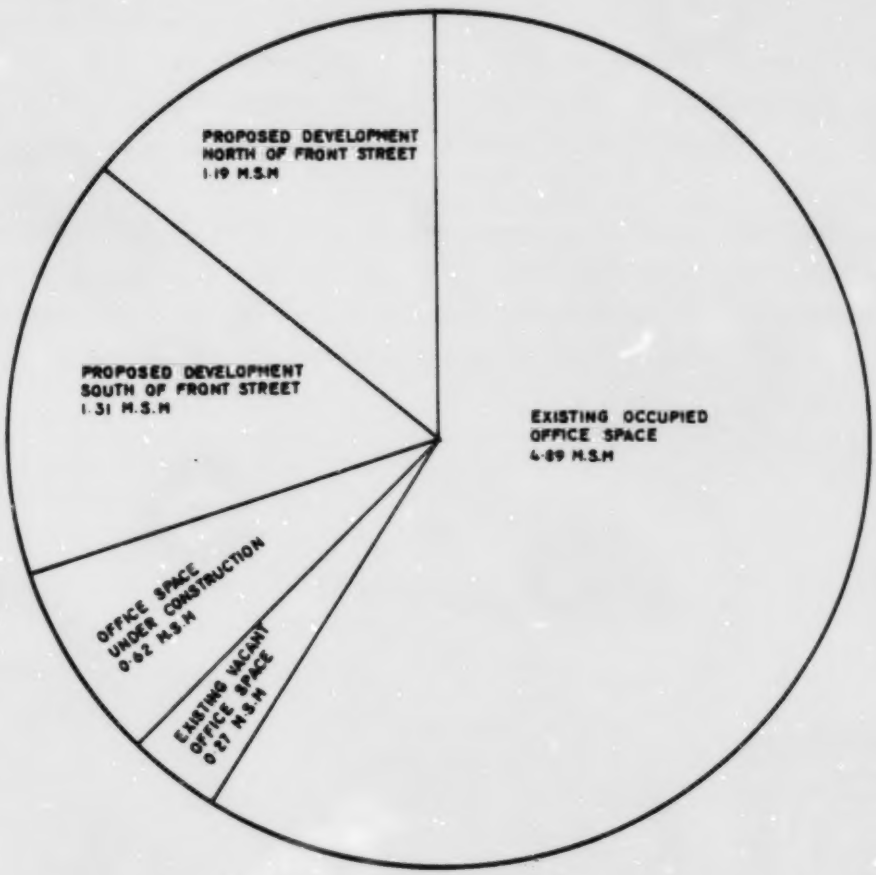
OFFICE SPACE STATISTICS

CITY OF TORONTO - CENTRAL CORE

	Office Space (M.S.M.)	Vacancy Rate %	Occupied Space (M.S.M.)
1976	4.3	9.0	3.9
1977	4.5	10.4	4.0
1978	4.7	9.4	4.3
1979	4.7	6.6	4.4
1980	4.7	4.2	4.5
1981	4.8	1.8	4.7
1982	4.9	2.0	4.8
1983	5.2	5.2	4.9
1984	5.5	9.8	5.0

SOURCE: City of Toronto, Office Monitor 1984

Exhibit 3.9 offers some important considerations in planning the routing of additional transit facilities into the Downtown. Almost all existing office employment is located north of Front Street, and on the basis of existing construction and development proposals over 50% of new office jobs will also be located north of Front Street. The office space that is presently vacant or under construction has the potential for creating a transit demand approximately equal to the existing reserve capacity on the University Subway. It will be necessary, therefore, that any new relief line be located to serve as many trips on the north side of Front Street as on the south side. The centre of gravity of office employment will continue to be located north of Front Street, and planning for a relief line should provide an adequate level of accessibility to office jobs located both north of Front Street and within the Railway Lands.



TOTAL OFFICE SPACE = 8·38 m. sq. (approx)
(EXISTING & PROPOSED)

SOURCE: CITY OF TORONTO
RESPONSE TO C.W.T.S

: CITY OF TORONTO
OFFICE MONITOR

CITY OF TORONTO
CENTRAL CORE
EXISTING AND
PROPOSED DEVELOPMENT
AS OF JANUARY 1, 1983.

EXHIBIT 3.9

Peaking Ratios

Exhibit 3.10 summarizes an analysis of peaking ratios on the Yonge and University lines south of Bloor for the years 1980, 81, 82 and 83, based on the average of three highest counts in the year for the A.M. period.

Exhibit 3.11 lists 1982 employment within 300m of existing Yonge-University subway stations south of Dundas, 1982 A.M. Maximum Hour station usage and the ratio of station usage to employment. The average ratio is 0.30.

This average ratio of peak hour station usage to adjacent downtown office employment of 0.30 indicates that for every 1,000 new office employees within reasonable access of the subway, it is reasonable to expect that there will be a demand on the subway for 300 more trips during the peak hour.

EXHIBIT 3.10

ANALYSIS OF PEAKING RATIOS

YONGE LINE - SOUTH OF BLOOR

Year	3 Hour	Max. 1 Hour	% of 3 Hour	Max. 15 Min.	% of Max. 1 Hour
1983	48,662	30,338	0.62	9,327	0.31
1982	51,224	31,678	0.62	9,552	0.30
1981	54,584	35,216	0.65	11,717	0.33
1980	49,331	32,139	0.65	10,309	0.32
Average for 1980-83	50,950	32,343	0.63	10,226	0.32

UNIVERSITY LINE - SOUTH OF BLOOR

1983	37,919	22,709	0.60	6,772	0.30
1982	39,037	23,722	0.61	7,310	0.31
1981	39,097	23,938	0.61	7,781	0.33
1980	40,311	24,946	0.62	8,251	0.33
Average for 1980 to 1983	39,091	24,829	0.61	7,329	0.32

EXHIBIT 3.11

1982 SUBWAY STATION USAGE TO EMPLOYMENT RATIOS

Station	1982 Employment* Within 300M	1982 A.M.Max.Hour	Peak Hour Subway Station Usage Rate
St. Patrick	22,400	5,201	0.23
Osgoode	13,700	3,660	0.27
St. Andrew	26,400	7,280	0.27
Union	19,300	6,742	0.35
King	37,600	12,372	0.33
Queen	19,200	6,250	0.33
Dundas	13,000	4,114	0.32
TOTAL	151,600	45,619	0.30**

* Employment levels determined by City of Toronto Planning & Development Dept.
**Subway Peak Hour transit trips per employee

Modal Split

Exhibit 3.12 lists person trips by mode entering the Central Area during the A.M. rush period from 1971 to 1983. The Central Area cordon presented here differs slightly from the Railway Cordon used for the Metro biennial Cordon Count Program. The west screenline of the Central Area cordon is Bathurst Street, whereas the Galt/Weston Railway line defines the west screenline for the Metro Cordon Count.

From 1971 to 1983, total person trips entering the Central Area have increased by 24.3% from 197,900 to 246,000. 73% of these increased trips were accommodated by TTC service, 18% by GO Rail Transit and other bus, and 9% by auto. During that twelve year period ridership on TTC surface transit actually declined and the subway accounted for all ridership increases on the TTC service into downtown.

Over the next two decades increases in office employment will be due to both structural changes in the economy, and growth in the population of the labour force.

The structural changes will affect all segments of the labour force in Metro Region including Metropolitan Toronto, where 85% of downtown employees lived in 1981. New office employment generated by structural changes will originate largely inside Metro and will result largely in an increase in trips into downtown by TTC..

The growth in the labour force will occur almost entirely outside Metro in service areas of GO Rail and other non-TTC transit operatiors and have the effect of increasing the share of trips into downtown by GO Rail

Approximately 30% of this growth in office employment is expected to occur among Metro residents who will make predominant use of TTC in work trips to the downtown. The remaining 70% of growth will occur among residents outside Metro who will use both TTC and GO Rail in travelling to downtown office locations. In the report it has been assumed that 55 to 60% of the new trips by non-Metro residents would be by GO Rail into downtown with the remaining transit trips by TTC. These assumptions result in the share of new transit trips indicated in Exhibit 3.13 and forecasts a 40% share of growth in transit trips by GO Rail, compared to an existing market share of 17%.

Exhibit 3.14 summarizes the analysis of transit demand into downtown using the trend analysis method. On the basis of trend analysis, transit demand into downtown for the year 2001 on the Yonge-University Subway varies from a high of 76,000 pph to allow of 70,000 pph during the a.m. peak period.

EXHIBIT 3.12

PERSON TRIPS ENTERING THE CENTRAL AREA CORDON
(Bounded by Bathurst Street, CPR and Don River)

2 HOURS: A.M. RUSH PERIOD

Year	Private Auto & Taxi	Subway	Surface Transit TTC Bus & Street Car	TTC Total	GO Train & Other Bus	TTC/GO Transit Total	Total Person Trips Auto+Transit
1971	82,100 41.5%	85,600 43.3%	19,600 9.9%	105,200 (53.2%)	10,600 5.4%	115,800 (58.6%)	197,900 100%
1973	84,800 40.2%	91,100 43.2%	24,000 11.4%	115,100 (54.6%)	10,800 5.1%	125,900 (59.7%)	210,700 100%
1975	80,600 37.4%	101,200 47.0%	22,400 10.4%	123,600 (57.4%)	11,100 5.2%	134,700 (62.6%)	215,300 100%
1977	84,800 37.4%	107,900 47.6%	19,900 8.8%	127,800 (56.4%)	14,100 6.2%	141,900 (62.6%)	226,700 100%
1979	92,800 39.2%	105,600 44.6%	20,200 8.5%	125,800 (53.1%)	18,100 7.6%	143,900 (60.7%)	236,700 100%
1981	82,700 33.1%	125,000 50.1%	20,500 8.2%	145,500 (58.3%)	21,400 8.6%	166,900 (66.9%)	249,600 100%
1983	86,100 35.0%	122,400 49.8%	18,100 7.4%	140,500 (57.2%)	19,400 7.9%	159,900 (65.1%)	246,000 100%
SHARE OF GROWTH 1971-1983	+4,000 9%	+36,800 76%	-1,500 -3%	+35,300 73%	+8,800 18%	+44,100 91%	+48,100 100%

SOURCE: City of Toronto Department of Public Works.

EXHIBIT 3.13

MODAL SPLIT

1981 SHARE OF TRANSIT TRIPS INTO DOWNTOWN

Transit Service	1981 A.M.Peak Hour Ridership (pph)	%
Yonge/University Subway S.of Bloor	59,154	68
TTC Surface Transit	12,930	15
GO Rail Transit	14,738	17
TOTAL	86,822	100

SOURCE: Metro/TTC Rapid Transit Study

ESTIMATED SHARE OF 1981 TO 2001 GROWTH IN TRANSIT TRIPS INTO DOWNTOWN

Transit Service	%
TTC Rapid Transit	55
TTC Surface Transit	5
GO Rail Transit	40
TOTAL	100

EXHIBIT 3.14

FORECAST DOWNTOWN TRANSIT DEMAND YONGE-UNIVERSITY SUBWAY

TREND ANALYSIS

	1981	2001
High Estimate	57,000	76,000
Low Estimate	51,000	70,000

1. Peak hour demand for 1981 is the upper and lower decile of trend demand taken from Exhibit 3.2.

DEMOGRAPHIC FORECASTING

The second method of estimating transit demand involved a demographic forecast of downtown office employment developed by Woods Gordon, a consultant to the project. This demographic forecast of downtown office employment was then used to estimate growth in downtown transit needs to the year 2001.

Study Process

This study was carried out by the consultant following the five-step procedure reflected in the attached flow chart diagram.

Step 1 - Population Growth Estimates

This step involved the selection of appropriate fertility and migration factors to develop a realistic forecast of population for the Metropolitan Toronto area.

Step 2 - Labour Force and Employment Growth Estimates

Employment growth based on forecast population growth was developed using participation rates in the labour market and appropriate factors for unemployment.

Step 3 - Structure of the Labour Force

Existing employment was allocated to fourteen various components of industry such as, construction, retail trade, services, manufacturing, etc., and the existing industrial structure for the Metropolitan Toronto area was modified for predicted changes in the economy.

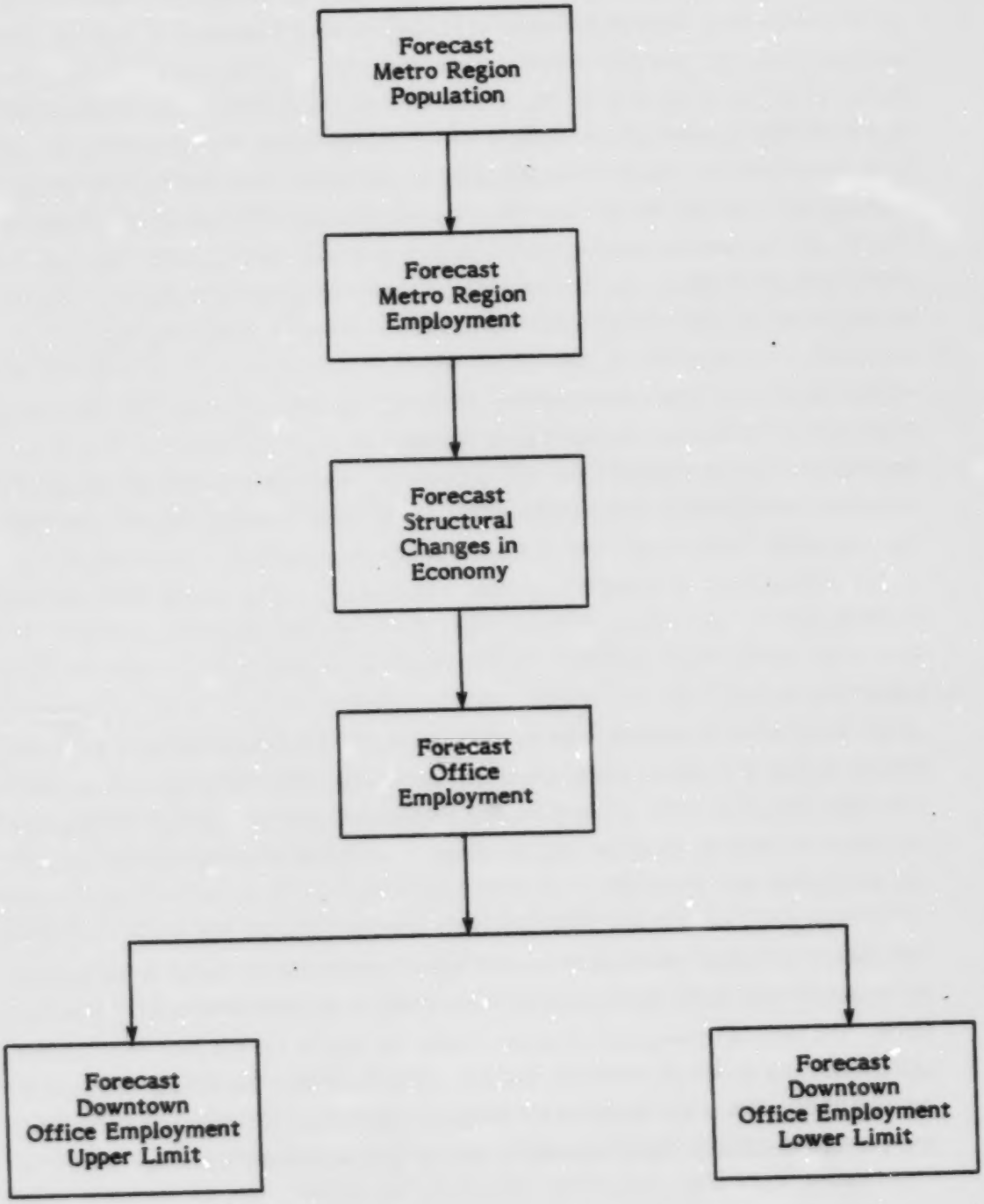
Step 4 - Office component of Labour Force

Total jobs in each industry sector were then assigned to office and non-office employment.

Step 5- Scenarios for Central Area Employment

On the basis of historical trends, deconcentration policies, and market forces, upper and lower estimates were developed for growth of office space in the downtown core.

EXHIBIT 3.15


Forecast Metro Region Population
Forecast Metro Region Employment
Forecast Structural Changes in Economy
Forecast Office Employment
Forecast Downtown Office Employment Upper Limit
Forecast Downtown Office Employment Lower Limit

Population Growth

Canada is currently experiencing a lower rate of population growth averaging about 0.6% from now until the end of the 1980's compared to an average growth rate of 1.2% per annum during the 70's. This lower rate of growth is caused by two factors; continuing low fertility rates and lower rates of migration to Canada. The fertility rate has declined steadily over the past twenty years and has now stabilized at approximately 1.75%, which is below the fertility rate necessary for population replacement in the absence of net immigration. Immigration to Canada during the 1970's averaged 144,000 people per year, with about 50% of this accruing to Ontario. Emigration from Canada averaged 73,000 persons per year with a net migration averaging 71,000 persons per year into Canada. During the 1980's and 1990's stricter government controls on immigration are expected to keep net migration levels to about 25,000 to 50,000 per year.

In February 1984 the Metropolitan Planning Department published a report Projections - Population, Labour Force, Households and Housing, 1981-2021, which assumed a medium fertility rate and a medium migration level in its forecast of population over the next forty years. This report indicated that by the year 2001 the population level for the Metro Region would increase from 3.4 million in 1981 to 4.4 million with 2.2 million of this population located inside Metropolitan Toronto.

Labour Force

As the baby boom generation, now aged 20 to 34, moves through the population the medium age of the population is generally increasing. The baby boom generation currently comprised 27% of the Canadian population, and 40% of the working age population. The baby boomers will continue to be in the working age group from now through to the year 2001.

The extent to which individuals choose to be in the labour force is called the participation rate and is a measure of working age population that is in the labour force. The rate for males has remained essentially stable for the past two decades and is expected to remain stable in the forseeable furture. The steady increase in the participation rate for women over the past thirty years is expected to stabilize, and perhaps decline to some extent in the future as women withdraw from the

labour force on both a temporary and permanent basis to have children. On the basis of the foregoing the participation rate by the year 2001 is expected to decline slightly from the existing 70.1% of the working age population to 66.2%, with an overall 26% growth in the labour force of the Metro Region from 1.9 to 2.4 million.

Employment

The Canadian, and in particular, the Metro Region economy is undergoing a transformation whereby employment is being increased in the service sector and decreased in the manufacturing sector. As the manufacturing industries change due to more competition, and world markets permanent job losses have resulted. This loss of jobs in traditional fields of employment will require employee re-training and adjustment. The consultant expects these adjustments in the economy and adjustments in employment to cause an increase in unemployment from the 4.1% experienced in 1981, to approximately 7.0% by the year 2001. For purposes of forecasting total employment in the Metro Toronto Region, an unemployment rate of 7% has been assumed in this report. The employment level in the Metro Region is expected to grow by 23% from 1,816,300 in 1981 to 2,238,400 by 2001.

Industry Structure

The standard industrial classification code groups employment under fifteen industrial sectors. A number of these sectors are expected to remain more or less stable over the next two decades. These include the construction industry, transportation, real estate and education. Areas that are forecast to increase their relative share of employment significantly are communications, business services, health services and tourism and recreation. The communications and business services reflect the management and processing activities associated with an information society. An increase in employment in health services is likely with an aging population, and with greater emphasis on health and fitness. With increasing leisure time and rising disposable income the demand for recreation and tourism activities is expected to increase, implying more employment in this sector.

These increases will take place at the expense of three of the more traditional sectors; the manufacturing industry, wholesaling and retailing. The entire manufacturing sector is undergoing change as traditional manufacturing methods are being replaced by automation and computer technology and high technology

industries gain in relative importance. The effect of these changes will be businesses that are more dependent upon engineering support and other office employees, and with fewer employees required for the manufacture, assembly and construction of the end product. Wholesaling and retail activities will be affected by the increase in the ease of communications through the use of computer ordering and automated inventory management.

Office Based Employment

The consultant estimates that office jobs presently account for 32% of total employment, and that over the next two decades this will increase with office jobs accounting for 35% of total employment by the year 2001. Between the years 1981 and 2001 total office employment in the Metro Region is expected to increase from the 1981 level of 588,700 to a 2001 level of 778,400 for a 32% increase in office employment during this twenty year period.

Downtown Office Employment

The proportion of Metro Region office space located in the downtown has fallen from 67% in 1967 to 57% in 1983. Over the past fifteen years the suburban and outlying areas of Metro have captured a sufficient share of the office market to now account for almost half of Metro's office jobs. The pace of growth in the areas outside the downtown has been substantially higher in the most recent five year period (1977-1982) than in any previous five year period .

Over the past fifteen years the downtown core has accounted for 46% of the new office space in the Metro Region. However, over the past five years there has been a marked shift towards the non-downtown office market. Whereas 46% of new office space in the Metro Region located in the central core between the years 1967 and 1982; during the five years between 1977 and 1982 only 27% chose a Downtown location. This decline in the attraction of downtown may be attributed to both market forces and government policies that together are acting to encourage more office development in suburban locations.

Market forces affecting new office location include the changing structure of the economy and the rental rates of downtown space relative to other available locations. The "hot" industries tend to be industries that have chosen suburban locations, while the more traditional downtown office oriented industries are expected to have a moderate growth future.

EXHIBIT 3.16

CURRENT, AND ESTIMATED FUTURE, EMPLOYMENT STRUCTURE IN THE METRO REGION

INDUSTRY SECTOR	CURRENT (1981) PROPORTION OF EMPLOYMENT	METRO REGION ESTIMATED GROWTH PROSPECTS	ESTIMATED PROPORTION OF EMPLOYMENT 2001
Primary Economic Activities	.012	- should remain stable	.01
Manufacturing	.239	- will decline in proportionate share	.19
Construction	.053	- should remain stable	.05
Transportation	.041	- should remain stable	.04
Communications	.035	- should increase significantly	.055
Wholesale	.061	- will decrease in response to better communications	.045
Retail	.115	- will decrease in response to better communications	.09
Finance & Insurance	.055	- will increase	.07
Real Estate	.024	- should remain stable	.02
Business Services	.064	- will increase	.075
Government Services	.052	- will increase slightly	.06
Education Services	.056	- should remain stable - structural changes to more adult education	.06
Health Services	.057	- will increase significantly	.08
Tourism & Recreation	.065	- will increase significantly	.085
Other/Miscellaneous	.071	- will remain stable	.07
TOTAL	1.00		1.00

SOURCE: Statistics Canada and Woods Gordon

EXHIBIT 3.17

EMPLOYMENT IN METRO REGION 1981

BY INDUSTRY SECTOR

Industry Sector	Employed Labour Force 1981 (actual)	Proportion of Office-Based Employment	Estimated Office Employment
Primary Economic Activities and Manufacturing	455,800	.220	100,330
Construction	96,300	.344	33,100
Transportation	74,500	.301	22,400
Communications	63,600	.321	20,400
Wholesale	110,800	.165	18,300
Retail	208,900	.085	17,800
Finance and Insurance	99,900	1.000	99,900
Real Estate	43,600	.306	13,300
Business Services	116,200	.939	109,100
Government Services	94,400	.736	69,500
Education Services	101,700	.030	3,100
Health Services	103,500	.180	18,600
Tourism and Recreation	118,100	.039	4,600
Other/Miscellaneous	129,000	.452	58,300
TOTAL	1,816,300	.347	588,700

SOURCE: Woods Gordon

EXHIBIT 3.18

ESTIMATED EMPLOYMENT METRO REGION IN 2001

BY INDUSTRY SECTOR

Industry Sector	Estimated Total Employed Labour Force	Proportion of Office-Based Employment	Estimated Office Employment 2001
Primary Economic Activities and Manufacturing	447,700	.220	98,500
Construction	111,900	.344	38,500
Transportation	89,500	.301	26,900
Communications	123,100	.321	39,500
Wholesale	100,700	.165	16,600
Retail	201,500	.085	17,100
Finance and Insurance	156,700	1.000	156,700
Real Estate	44,800	.306	3,700
Business Services	167,900	.939	157,700
Government Services	134,300	.736	98,800
Education Services	134,300	.030	4,000
Health Services	179,100	.180	32,200
Tourism and Recreation	190,300	.039	7,400
Other/Miscellaneous	156,600	.452	70,800
TOTAL	2,238,400	.347	778,400

SOURCE: Woods Gordon

Government policies affecting new office location include policies of deconcentration and the transportation programs being pursued toward implementation of these policies. Commitments to new transit facilities, such as the Scarborough R.T. and Park Home Station, have resulted in development decisions to chose locations such as Scarborough City Centre or North Yonge Centre; while increasing congestion on both roads and transit has tended to discourage downtown locations.

The uncertainties of the future office market for the downtown led to forecasting a range of growth in downtown office employment. In developing this range a number of influencing factors have been considered:

1. Over the past fifteen years 46% of new office employment has located downtown.
2. Over the past five years 27% of new office employment has located downtown.
3. Changes in the structure of the economy favour suburban office location.
4. Deconcentration policies of Metro have resulted in improved transit service in the suburbs .
5. Metro has already committed major public investment in support of the downtown economy and this report assumed that this public policy would be continued. Therefore, while traffic congestion is assumed, this report also assumes that investment in new downtown transportation facilities will continue to be made in response to demand from work trips into downtown, and thereby avoid unacceptable levels of congestion.
6. Higher rental rates in downtown favour suburban locations.

Without either deconcentration policy or transportation constraints it is considered that market forces alone will work against any possible resurgence of downtown to its former dominance of the office market. Under the upper range of growth, the consultant considered it reasonable to expect that the downtown would capture about 40% of the future office jobs in the Metro Region over the next twenty years. In estimating a lower range of growth for the downtown, it was considered reasonable to forecast that shifts in locational policies may reduce this to about

20% of the total Metro Region office market. The upper and lower ranges of growth in office employment and transit demand under these two scenarios is shown in Exhibits 3.19, 3.20, 3.21, and 3.22.

Since 1974 the TTC has been promoting variable work hours as a means of reducing congestion and crowding on its system. With a progressive campaign that involved advertising and the distribution of employee and company literature, this program has had a limited affect on the distribution of travel during the peak period, with most of the benefits occurring when large employers such as the government offices on University Avenue and the insurance companies on University Avenue introduced variable work hour programs in their company offices. The TTC continues to promote this program. In calculating the peak demand indicated on Exhibit 3.21 for the year 2001, it has been assumed that this program will be successful in reducing peak hour conditions from the present 62% of total a.m. work trips to 55%.

Exhibit 3.23 provides a summary of the high and low estimate of southbound transit demand on the Yonge-University Subway in the a.m. peak period for the year 2001 using the demographic analysis method.

EXHIBIT 3.19

GROWTH IN DOWNTOWN OFFICE EMPLOYMENT

1981 to 2001

	Upper Limit	Lower Limit
Downtown Core	75,760	37,880
Rest of Metro	113,640	151,520
Total Region	189,400	189,400

SOURCE: Woods Gordon

EXHIBIT 3.20

GROWTH IN DOWNTOWN CORE OFFICE SPACE

(M.S.M.)

	Upper Limit	Lower Limit
Downtown	1.9	1.0
Rest of Metro	2.9	3.8
TOTAL REGION	4.8	4.8

NOTE: Office space requirements computed on the basis of 25.5 s.m. per employee

EXHIBIT 3.21

GROWTH IN WORK TRIP DOWNTOWN TRANSIT DEMAND

1981-2001

Passengers Per Hour

	Share of Transit Demand	Upper Limit	Lower Limit
Yonge-University Subway	55	18,563	9,281
TTC Surface Transit	5	1,688	844
GO Rail Transit	40	13,500	6,750
$TOTAL_1$ (Work Trip)		33,751	16,875

1. Transit demand is calculated on the basis of a modal split of 90% transit and 10% auto for new office work trips into Downtown using a 55% peaking factor and a 10% absentee rate. Note that the auto share of growth in person trips into the Central Area between 1971 and 1983 was 9% (Table 3.8).

2. Note that most growth in downtown employment is assumed to occur south of Bloor Street and result in increased demand on the Yonge-University Subway.

EXHIBIT 3.22

GROWTH IN TOTAL DOWNTOWN TRANSIT DEMAND
A.M. Peak Hour Ridership

Passengers Per Hour

	A.M.Peak Hour Non-Work Trip Componment	Upper Limit	Lower Limit
Yonge-University Subway	10%	20,419	10,209
TTC Surface Transit	10%	1,857	928
GO Rail Transit	10%	14,850	7,425
TOTAL		37,126	18,562

EXHIBIT 3.23

FORECAST DOWNTOWN TRANSIT DEMAND
YONGE-UNIVERSITY SUBWAY

DEMOGRAPHIC METHOD

	1981[1]	2001
High Estimate	59,154	79,573
Low Estimate	59,154	69,363

1. Peak hour demand is the average of the three maximum counts of the peak point on the Yonge and University Subway for 1981.

TRAVEL DEMAND MODEL FORECASTING

Simulation Methodology

The simulation of travel demand was done with the aid of a computerized model developed by the staff of the Metropolitan Planning Department. The travel demand model is a conventional four-step (i.e., trip generation, trip distribution, modal split and assignment) aggregate type based on the Simplified Transportation Planning Computer Package (STPCP) developed by the Ontario Ministry of Transportation and Communications, augmented by other computer sub-program developed by MTC and the U.S. Department of Transportation.

The model produces a.m. peak hour travel demand forecasts for the Toronto Census Metropolitan Area (including Metro Toronto, Peel, and parts of Halton, York and Durham). Trip generation was based on population, employed labour force and employment estimates prepared for the Provincial GO ALRT Program. Trip distribution is based on relationships derived from the 1971 Census place of residence/place of work data; 1981 Census data was not available for model updating at the time. Modal split is based on factors derived from a 1980 employee travel survey.

Calibration of the model, the process of testing the ability of a travel demand model to simulate an observed situation, was done using a composite 1980/81 land-use data bank. Land use is based on the GO ALRT Scenario A, which is a moderately optimistic projection of regional growth to 2001. Of key interest in the current study is the assumed growth in downtown employment. Employment growth for Planning District 1 is projected at about 48,600. Total growth for the Central Core, including the Financial Core and the area south of Front Street is projected at 35,900 above the 1981 employment level.

Minor adjustments were made to the road and transit networks within Metro Toronto. Additional suburban surface transit routes (including cross-boundary extensions) were added, road speeds were adjusted downwards to reflect increasing traffic congestion, "missing links", such as the Leslie Street extension were added and an additional two minute transfer time penalty was introduced at the Bloor/Yonge Station to reflect crowded conditions. On the GO Rail service into

the downtown a minimum twenty minute service frequency was assumed on the Lakeshore, Milton, Georgetown, and Richmond Hill services during peak period.

Model Application

Selected link loadings on the existing TTC subway system approaching and entering the Central Core area are shown in Exhibit 3.24. Several key points regarding these assignments should be noted:

- These projections reflect <u>average</u> weekday conditions, unlike the TTC annual subway peak point counts, which reflect <u>peak</u> season flows. Historically, the difference between annual average and peak season average flows is 15%. The 15% peaking factor would increase peak point demand to 39,200 on Yonge and to 33,600 on University.

- The 2001 network includes a transfer penalty to account for congestion at Bloor/Yonge. This results in some trips from the north-east of Bloor/Yonge being diverted from Bloor-Danforth to Yonge, and some from south-east of Bloor/Yonge being diverted to east-west streetcar lines. Also, some trips from Bloor West will be diverted from Yonge to University.

- Projected increases on the Bloor-Danforth Subway approaching the Central Core are significant, with peak point inbound loads rising to about 34,000 west of Yonge and 32,000 east of Yonge. Inclusion of the 15% peaking factor would raise these estimates to 39,000 and 36,800 respectively, indicating a potential overloading on both the Danforth and Bloor lines before 2001.

EXHIBIT 3.24

SIMULATED PEAK POINT LOADS

(A.M. PEAK HOUR, INBOUND)

	2001 Average Week Day	2001 Peak Season
Yonge (South of College)	34,065	39,174
University (South of Bloor)	29,177	33,554
Bloor West (West of Spadinia	34,038	39,144
Bloor East (East of Yonge)	32,069	36,879
Spadina (North of Bloor)	14,942	17,183
Yonge (North of Bloor)	22,242	25,578

OVERVIEW OF TRANSPORTATION NEEDS TO 2001

The estimates of demand on the Yonge-University Subway are summarized in Exhibit 3.25. The three methods produce reasonably consistent results ranging from a low forecast of 69,363 peak period pph during the peak season to a high of 79,373. This variation in the forecast reflects load fluctuations that may result from changes in downtown employment due to economic cycles and uncertainties presently affecting the Canadian and Metro economies.

In developing a "best" estimate of the range of demand for the year 2001, the three low estimates and three high estimates have been averaged to produce a high-low range for testing deficiencies and transit options in the remainder of this report.

This approach to averaging the three forecasts produces an estimate of demand for the Yonge-University line during the a.m. maximum hour, ranging from a low of 71,000 pph to a high of 76,000 pph for the year 2001.

EXHIBIT 3.25

SUMMARY

DOWNTOWN TRANSIT DEMAND YONGE-UNIVERSITY SUBWAY - 2001

(A.M. Peak Hour)

	High	Low
Trend Analysis[1]	76,000	70,000
Demographic Forecast[2]	79,573	69,363
Travel Demand Model[3]	72,728	72,728
Average	76,000	71,000

1. From Exhibit 3.14
2. From Exhibit 3.23
3. From Exhibit 3.24

SECTION 4 - EXISTING SUBWAY SYSTEM CAPACITY

Thirty years after the opening of the first line the Subway has grown from the original 7.4 kilometers to 54.4 kilometers, and if it were all built today (using 1984 dollars) the present subway system in Metropolitan Toronto would cost in excess of $2.4 billion. This 54.4 kilometer subway network provides service to Downtown Toronto from almost all sections of Metropolitan Toronto.

Just how important is the subway to Toronto's transportation system? One measure of the importance of this subway is the number of bus connections that are made to it by both TTC and regional buses through the Metropolitan Toronto regional area. During peak period operation on a week day the four major transit operators in the Metropolitan Toronto region operate in total 1,643 buses. Of this total number of buses 1,517 make direct connections to subway stations. On the TTC system 98% of the buses operating during peak period connect to the subway. On GO Transit 38% of their buses connect to the subway. On the Mississauga Transit system 91% of the buses operating during peak period connect to the subway system; and Markham Transit make connections with 63% of their operating fleet in the peak period.

A large factor in this growth in transit demand has been the growth in office space in Downtown Toronto. During the past decade over a million square meters of new office space has been added to Downtown Toronto, and this has added work space for over 40,000 new office workers in the Downtown area. The subway and the growth of office space in Downtown are definitely interrelated. Whether the subway was responsible for the growth or whether the growth was responsible for the demandfor subway service, is somewhat immaterial. The facts are that neither a viable Downtown nor a successful subway could exist without each other.

What is the maximum capacity of the existing subway system serving Downtown Toronto? On the basis of space analysis of seating and standing room, the TTC establishes maximum service loading standards for all operating transit vehicles. These loading standards are one of a number of criteria used by the TTC in establishing the service frequency on transit routes throughout Metro. Through this analytical approach the crush load capacity of a 75 foot subway car is established by TTC at 225 passengers. This loading standard was adopted in the

development of Level of Service standards used in this report to compare demand with the ability of the system to meet that demand. The Level of Service concept was developed with the assistance of University of Toronto staff and students, and has been developed to provide a measure of crowding conditions on trains and platforms. These Level of Service standards are indicated in Exhibit 4.1.

Are the Service Standards Set By TTC Reasonable? In a January 1984 survey of the p.m. rush period by University of Toronto students, under supervision of staff, it was noted that during the peak hour 55% of trains stopping at stations between Queen and Bloor left passengers standing on the platform; and that all of the peak hour trains surveyed included one or more cars which provided a level of service that was rated at Level E or Level F. During a February, 1984 a.m. peak hour survey it was noted that thirteen out of twenty-eight trains operating southbound through the Bloor Station on the Yonge Subway left as many as 250 passengers standing on the platform.

These observations of the quality of service and level of service provided to passengers using the downtown subway system provide an indication that the demand on the system is approaching its capacity. This view is further supported by the results of a 1982 survey conducted for the TTC in which 73% considered overcrowding a problem and 57% of those surveyed considered the overcrowding so bad that they would personally prefer avoiding the use of the TTC.

Further evidence of the crowded conditions and the near capacity loads that are being experienced can be found in observing changes in travel patterns. Already more Bloor-Danforth Subway passengers choose during the a.m. peak period to transfer southbound at St. George Station than to transfer at the Yonge-Bloor Station. In a 1978 survey of transfer traffic at the two stations, during the peak period over 17,000 Bloor-Danforth passengers transferred to the southbound at the St. George Station compared to less than 14,000 transferring southbound at the Yonge Station.

From the evidence of rider response to crowd conditions, and either inability or unwillingness to board trains operating in the upper range of Level E and lower range of Level F, the conclusion is reached that the loading standards adopted by

EXHIBIT 4.1

YONGE-UNIVERSITY SUBWAY
LEVEL OF SERVICE

Level of Service	Description	Volume to Crush Load Ratio	Car Loading	6 Car[1] Train Loading	Line[2] Capacity
A	Choice Seating Zone. No standees.	0- .25	0- 56	0- 319	0- 9,000
B	Seating Zone. Some Standees. Relative east of movement within car.	.25- .50	56-112	319- 638	9,000-18,000
C	Standee Zone I. Almost all seats used. One standee for each seated passenger. Limited movement within car.	.50- .75	112-169	638- 963	18,000-27,000
D	Standee Zone II. No seating available. Three standees for every two seated passengers. Circulation within car difficult.	.75- .85	169-191	963-1,089	27,000-31,000
E	Contact Zone. Extremely crowded. Some passengers left on platform.	.85- .95	191-214	1,089-1,220	31,000-34,000
F	Close Contact Zone. Crush loading Passengers regularly left on platform. Movement within car only possible enmasse. System delays and stoppages start to occur	.95-1.00+	214-225[3]	1,220-1,283	34,000-36,000+

1. The 6 car train loading is calculated as 95% of the total of individual car loadings to allow for uneven distribution of passengers.
2. Calculated on the basis of 28 trains per hour.
3. A passenger load of 225 pph on each of the six cars in a train set operating on a schedule of twenty-eight trains per hour produces a theoretical crush capacity for the line of 37,800 pph.

TTC reasonably reflect the limits of crowd tolerance by TTC riders. It is also reasonable on the basis of the observational evidence to conclude that the upper limit of Level of Service E represents the maximum reasonable capacity of the existing subway lines.

Can the Frequency of Trains on the Yonge-University-Spadina Subway be Increased? The present signal and trackwork system is designed for a 120 second headway and 30 second station stops. When trains are operating at a smaller time interval than 120 seconds, or when station stops exceed 30 seconds, a stop and go traffic jam occurs in the subway tunnels. In fact, this situation already occurs at times on the Yonge Subway as trains approach the Yonge-Bloor Station. The south bound stop-and-go traffic south of Rosedale in the mornings, and northbound north of Wellesley in the evening, is caused by dwell times (station stops) that exceed the maximum dwell time permitted by the existing system design.

Headway is a measure of train separation on the system and like private vehicles on a highway, a safe separation must be maintained to avoid rear-end collisions. The critical separation between any two trains occurs when a moving train approaches a stopped train at a station platform. The approaching train cannot enter the station area until the preceding train has left and is a safe distance into the tunnel. This minimum headway can be expressed by the equation $T_H = T_1 + T_2 + T_3 + T_4$ where:

T_H = Minimum Headway (seconds).

T_1 = Entry Time (seconds).
This is the time that elapses from when a train initially enters a station until it comes to a full stop.

T_2 = Dwell Time (seconds).
TTC normally allows 30 seconds for dwell time at line stations

T_3 = Departure Time (seconds).
This is the time required for a train to leave the station platform and travel a safe distance into the tunnel and is measured from start of departure until the platform approach signal turns green. This

duration is controlled by the signal system to ensure a safe separation of trains operating on the subway line.

T_4 + Sighting Time (seconds).
This is the time required to provide the operator with an opportunity to see the green signal and provide a tolerance for uneven headways and greater than normal dwell times. The TTC normally allows 15 seconds for "Sighting Time" in the system design.

At Bloor Station the maximum permitted dwell time is regularly exceeded with the result that passengers experience stop and go traffic in the tunnels. In a 1984 survey of southbound trains operating during a.m. rush hours at the Bloor Station on the Yonge Subway, the following times were observed:

	Range	Average
T_1	18.0-16.0	17.5
T_2 (Dwell)	74.0-42.0*	52.0
T_3	54.0-50.0	52.5
T_4	15.0-15.0	15.0
TOTAL (T_H)	161.0-123.0	137.0

* The range of values for dwell time is based on the peak hour of operation during a survey January 17, 1984, with 10% of the highest values and 10% of the lowest values discarded.

The existing service headway is 130 seconds. A service breakdown occurs and trains are held in the tunnels when T_4 (the sighting time) approaches zero. With trains operating on scheduled headway this stop and go condition will occur whenever the dwell time approaches 60 seconds ,130-(T_1+T_3).

130,000 passengers transfer from train to train on a typical week day at this major transfer point, and the large dwell times primarily result from conflict between passengers getting off and passengers getting on trains at the same platform and through the same doors. Stations where the volume of transfer traffic experienced at the Yonge-Bloor Station is expected, may in future be designed with separate platforms for boarding and off-loading passengers.

Opportunities for improvements to the capacity of the station and to passenger flow, were the subject of a study by TTC staff in 1982, and more recently by consultants. The consultant's report notes that "the potential for improving passenger movement within the station is limited by the structure, foundation and basements of both the station and the surrounding buildings". The report further notes that "while the recommended improvements to Yonge-Bloor Station will improve transfer movements of passengers between the Bloor and Yonge Subway lines and also increase the available waiting and circulation area of the Yonge platform, these limited station improvements will not, in our opinion, significantly affect the station dwell time of the subway trains".

Consultants have prepared recommendations for six improvements to the Yonge-Bloor Subway Station that are designed to increase the passenger capacity of this station:

Proposal No. 1

Replacement of the walls between the Yonge platform and the mezzanines with columns to provide more free access between the Yonge platform and the mezzanine.

Proposal No. 2

Widening of the Yonge Subway platform to increase the available waiting area and allow better circulation on the platform.

Proposal No. 3

Expanding the east mezzanine to allow improved access between the north-bound platform and the east mezzanine.

Proposal No. 4

Construction of a Hayden Street entrance to provide direct access to the Yonge Subway platform from the south-east corner of Yonge-Bloor.

Proposal No. 5

Construction of a Yonge Street entrance to provide direct access to the Bloor Subway platform from the north-east and north-west corners of Yonge-Bloor.

Proposal No. 6

Construction of additional stairs and escalator between the Bloor Subway platform and the mezzanine to increase exiting capacity from the Bloor platform.

These improvements are expected by the Consultant to improve circulation within the station, but are not expected to have a significant impact on dwell time at the station platform. These proposals should receive consideration by the TTC as measures to improve passenger flow and safety within the platform and mezzanine circulation areas of the station, but should not be regarded as a measure that will allow an increase in the frequency of trains on the Yonge Subway line.

These studies of headway and passenger circulation at the Yonge-Bloor station indicate no significant opportunity to increase the frequency of trains on the Yonge-University subway and no opportunity to meet increased demand through higher volume capacity on the existing subway system.

Overview

The Yonge Subway has operated over the past ten years at Level of Service E with a train frequency of 28 trains per hour. Passenger response and observation of crowding on platforms indicates that Level of Service E represents the maximum crowd conditions acceptable to passengers on this line. Delays in boarding and off-boarding at the Yonge-Bloor interchange station preclude the opportunity for more frequent train service as a measure for relieving overcrowding. It can be reasonably assumed that the Yonge Subway is now operating close to capacity and that further loading may in fact lead to reduced capacities as congestion causes delays and system breakdowns.

SECTION 5 - TRANSIT DEFICIENCIES

Demand For Downtown Rapid Transit

The single most important factor influencing transportation policies for Metropolitan Toronto over the next two decades will be the estimate of demand for transportation into downtown generated by work trips to downtown offices. This estimate is pivotal in the decision to make capital investments in new transit facilities such as the Downtown Rapid Transit line.

In view of the importance this estimate has for major decisions regarding future transit; and in view of the uncertainties in today's dynamic world, three separate methods have been used to forecast transit demand into the downtown through to the year 2001 and beyond. The methods used in the forecast have included a trend analysis, demographic analysis and transportation modelling. The trend analysis has consisted of a review of historical ridership trends and a projection of those trends into the future. The demographic forecasting has involved a forecast of population for the Metropolitan Toronto area and an estimate of the percentage of this population that will work in downtown offices. Finally, the third method used to develop the forecast for demand through to the year 2001 has involved the application of a transportation model based on a planning computer package developed by Metropolitan Toronto Planning Department. In the demographic forecast of downtown office employment, consideration was given to anticipated changes in the structure of the Canadian economy and in the impact of deconcentration policies on locational decisions by potential downtown office employers.

Today 32% of the labour force is employed in offices. By the year 2001 this is expected to increase to 35%. Coincident with the growth in office employment, will be a significant shift to office locations in the suburbs. Over the past fifteen years 46% of new office space has been located in the downtown. This is not expected to continue in the future. The upper limit of the downtown share of the office market over the next twenty years has been estimated at 40% of the Metro Region market and the lower limit estimated at 20%.

However, under either scenario the rate of growth in downtown office employment pushes demand for transit into downtown beyond the capacity of the existing transit system.

The results of these demand studies are tabulated in Exhibit 3.25. This tabulation shows reasonably consistent estimates of future transit requirements into downtown for the year 2001. These estimates forecast a 30% to 40% growth in demand for rapid transit trips into downtown on the Yonge-University Subway during the a.m. peak period in the twenty year period from 1981 to 2001.

Estimates of the Capacity of the Existing Downtown Transit System

Transit service into downtown Toronto is provided on the Yonge-University Subway, the TTC surface transit system and GO Rail Transit. In 1975, T. Parkinson prepared an estimate of the capacity of these three systems into downtown for the City of Toronto Central Area Plan Review.

In his report to the City of Toronto Mr. Parkinson set the "realistic capacity" of the subway into downtown at 66,000 pph, or 33,000 on each line. This "realistic capacity" was intended to reflect the system load that can be carried during peak period without system breakdown, and excessive passenger crowding or delays on station platforms.

In 1982, the TTC prepared an estimate of the capacity of the transit system into downtown that included an estimate of 37,800 pph for each line, or a total subway capacity of 75,600 passengers in a peak hour period. This estimate reflected Level F or crush loading for each of the cars making up a train set for every train operating in the peak hour. Level F loading is achievable on an individual car or train; but cannot be sustained on a regular basis, and is an impractical measure of capacity for more than a few trains operating over a short duration of time.

The Level of Service study, conducted with the assistance of the University of Toronto, provides evidence, when considered together with ridership records over the past ten years, to suggest a maximum practical capacity at the Level of Service E loading with a line capacity of about 34,000 pph. This capacity level has been applied in the calculation of deficiencies in this report.

EXHIBIT 5.1

DEMAND

SUMMARY OF FORECAST DEMAND

FOR TRANSIT SERVICE INTO DOWNTOWN

2001 A.M. PEAK HOUR

	High Estimate		Low Estimate	
	% Growth 1981-2001	PPH	% Growth 1981-2001	PPH
Yonge-University Subway	40%	76,100	30%	70,700

EXHIBIT 5.2

CAPACITY

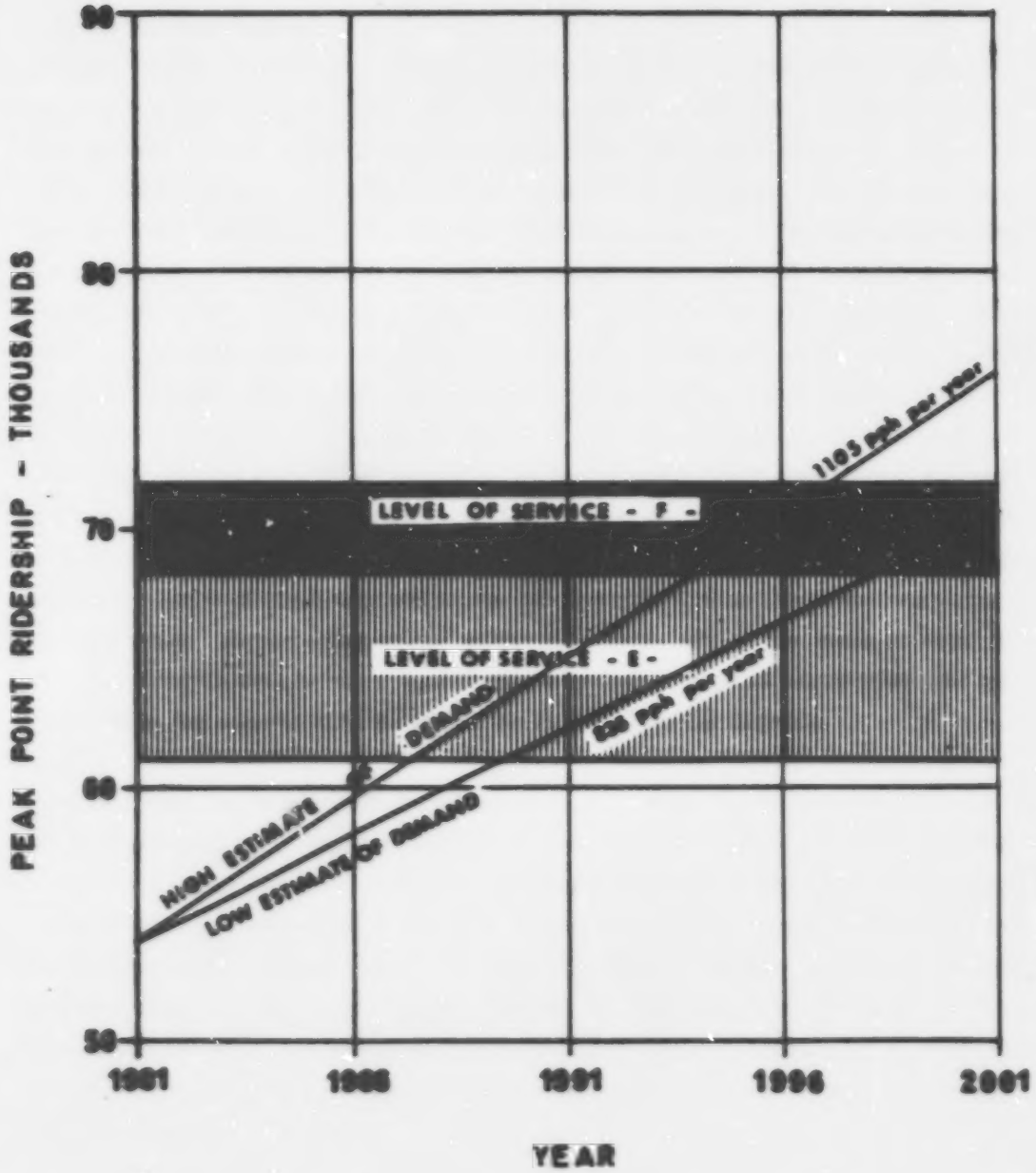
SUMMARY OF A.M. PEAK HOUR CAPACITIES OF EXISTING TRANSIT SYSTEM

Transit Service	T.Parkinson Estimate (Central Area Plan Review,1975)	TTC Estimate (Metro/TTC Rapid Transit Study 1982)	DRT Estimate
Yonge/University Subway	66,000	75,600	68,000 (Level of Service E)

Deficiencies

Deficiencies in the transportation system cannot be measured in absolute values, but rather in the level of service available to the public wishing to use the system. In the twenty year period between 1961 and 1981, subway ridership into downtown during the a.m. peak hour grew by about 80%. Over the next twenty years, a growth of 30 to 40% is predicted in this report. This growth in demand will increase ridership on the Yonge and University Subways and increase congestion and crowding in stations and on-board trains. This forecast growth in demand on the Yonge-University Subway is tested against Level of Service in Exhibit 5.3. By the late 1980's both the Yonge and University subways are expected to be operating at a Level of Service E, and by the mid 1990's this Level of Service will have further deteriorated to Level of Service F for both subway lines. At this Level of Service, delays, stoppage in tunnels, and service breakdowns are expected to occur on a regular basis on both subway lines, and transfer capacity at both St. George and Yonge-Bloor Station will become critical.

The greater reserve capacity of trains entering from the north, plus the layout of stairs and escalators, has made St. George Station a more efficient transfer station than Yonge-Bloor, with the result that more passengers already transfer at St. George than at Yonge-Bloor during the peak period. The transfer capacity of Yonge-Bloor has already been reached and crowd control measures are being introduced by the TTC. As transfer traffic at St. George increases, the capacity of this station may become more critical than line capacity on the University line. The TTC should monitor passenger conditions at this station and plan crowd control measures comparable to the Yonge-Bloor Station.



FORECAST GROWTH IN DEMAND FOR RAPID TRANSIT SERVICE INTO DOWNTOWN

EXHIBIT 5.3

SECTION 6 - THE SURFACE TRANSIT OPTIONS

Existing Surface Transit

Existing surface transit into Downtown consists of four streetcar lines and three bus and one trolley line. The four streetcar services operating on King, Queen, Dundas and Carlton carry a total of about 7,500 passengers in the peak hour of travel into Downtown. The four bus and trolley services operating on Church, Bay, Avenue Road and Spadina carrying about 5,000 passengers into Downtown during the peak hour. These surface routes either serve local residential population in the general area south of Bloor-Danforth between High Park and the Beaches, or they serve as local distributors to employment areas immediately south of the Bloor-Danforth Subway. The Queen streetcar is a typical service to downtown residents of the City of Toronto. The Bay trolley on the other hand, primarily operates as a distributor serving work trips to work locations between Bloor and Queen. Demand for service on these downtown surface routes is highly dependant upon the downtown resident population. Over the past decade the City residential population has been declining and so too has the ridership on the downtown surface transit routes. These routes do not effectively serve any of the areas forecast to be major contributors to the future increase in downtown work trips; trips that will originate in the suburbs with a destination in the Financial District.

Proposed Surface Transit Improvements

While these existing surface transit routes have not successfully attracted ridership from the subway system; a number of alternatives involving new more direct surface transit, have been proposed towards providing relief to overcrowding on the Yonge-University Subway south of Bloor-Danforth. These proposals include systems such as light rail transit similar to what is now operating on the Queensway between Roncesvalles and the Humber Loop, or express bus services on exclusive transit lanes, similar to the operation on the Allen Road Extension or Eglinton Avenue.

Both operations require transit priorities that permit the transit vehicles to bypass traffic congestion on the streets. These transit priorities may include restrictions on left turns, restrictions on access to private property, and they may include restricting the amount of cross traffic permitted on the transit route. Both

surface transit options presuppose that existing right-of-way can be transferred from existing use, usually local traffic and parking lanes, to exclusive transit usage during the peak period. For example, four lane streets may be reduced to two lanes, or parking lanes may become traffic lanes; sidewalks may be narrowed, or shoulders may be surfaced to become traffic or transit lanes.

The LRT Surface Transit Option

Light rail transit should not be confused with a streetcar operation. Streetcar operation implies the operation of transit vehicles in mixed traffic with speeds limited to the average speed of all vehicles operating on that street during rush hour. In Downtown Toronto this means an average operating speed of less than 10 km per hour. This operating speed and this level of service will not be successful in attracting riders from the subway system and diverting transit trips. Light rail transit is a medium cost investment, and if it's to provide a transit service that is more attractive than existing bus services on city streets it must have an exclusive right-of-way in the direction of travel, and it must have operational transit priority measures that preclude operational delays due to backups at street intersections and turning points.

Light rail transit requires that a right-of-way be provided for two sets of tracks in each direction. It requires that there be restrictions placed on access to private properties abutting the street. This means that private property on a street would generally be restricted to right-in right-out access. Likewise, secondary streets on the light rail transit route would be restricted to right-in right-out turns and through traffic on those secondary streets would be prohibited. The implementation of a light rail transit service requires the construction of tracks and overhead and a substantial investment in plant facilities to accommodate the LRT operation.

Recent proposals for light rail transit service have included Parliament, Bay and Spadina.

PARLIAMENT LRT

The Parliament LRT service would operate from the Castle Frank Station on the Bloor Subway, south on Parliament Street to a Richmond-Adelaide loop. The

service would require exclusive transit lanes during the hours of operation in a median on Parliament Street and would reduce the existing street to one lane in each direction. Property access on Parliament Street would be limited to right turns in and right turns out and secondary streets such as Amelia, Winchester or Spruce would be closed to cross traffic and be limited to right turn in right turn out movements.

BAY LRT

The Bay Street light rail transit line would connect to the Bloor Subway at Bay Station and be routed south on Bay to Union Station continuing to Queen's Quay where it would turn west to merge with the proposed Harbourfront LRT. In a recent study conducted for the City of Toronto, consultants concluded that existing traffic conditions on Bay Street made it impossible to make right-of-way available for exclusive LRT operation, and they further concluded that an LRT service in mixed traffic would provide no better transit service than is now offered by the existing trolley operation. The consultants report concluded that the only right-of-way available for a Bay LRT would be underground. An underground LRT is comparable to a subway with comparable costs.

SPADINA LRT

The Spadina light rail transit proposal would involve an LRT operation connecting to the Bloor Subway at the Spadina Station and routed south on Spadina to Queen's Quay, where it would turn easterly to merge with the proposed Harbourfront LRT. The street width on Spadina is such that it permits the dedication of right-of-way for exclusive LRT operation without serious impact on local parking and traffic. Property and local street access would be restricted to right-in and right-out, and left turns would be restricted to major arterial streets only. This means that left turns would be permitted only at streets such as Harbord, College, Dundas, Queen, King and Front Streets. Implementation of this light rail transit proposal is dependent upon reconstruction of the Spadina Avenue bridge over the railway yards south of Front Street. The timing for the construction of this bridge is dependent not only on budget constraints, but also on plans by the railway for removal of the existing yards and consolidation of the railway operations through the railway lands.

LRT OVERVIEW

Parliament Street offers a relatively direct and uncongested route from Bloor Street to downtown. However, an LRT operation would require that existing road space be transferred to transit usage. Parliament presently serves local traffic and local residents providing for both local auto travel and local parking. The right-of-way necessary for light rail transit requires that local interests be sacrificed to provide a better trip for suburban residents. The proposal for light rail transit is a proposal that local street space serving local residents be given up in the interest of work trips to downtown by residents of suburban Metropolitan Toronto. Light rail transit on Parliament is unlikely to improve transit for local residents in this area and the impact of this service on various other uses of the roadway would be severe.

Light rail transit by definition means medium or low cost investment. The proposal for light rail transit on Bay Street is not a low cost solution. It involves underground construction, including underground stations from Bloor Street through to Front Street and would be comparable in cost to a subway and comparable in cost to the proposed relief line from Union Station north-easterly to Donlands or Pape Station. The Bay Street option, therefore, cannot be considered in the same context as other short term low-cost surface relief options. The merits of the Bay Street option must be balanced against options of comparable cost such as an East Relief Line and in the context of long term policy positions of Metro and TTC. In short, the Bay LRT may offer an alternative routing to the relief line or downtown rapid transit, but it is not a "surface relief option".

The concept for the Spadina light rail transit offers an opportunity for an LRT operation that has the potential of providing limited relief from overcrowding due to transit trips originating in west Metro. Transit ridership on peak link points on the Bloor Subway west of St. George Station, and transfer traffic at the St. George Station are starting to approach the capacity of these facilities, and one of the problems that will be faced in the future, will be the problem of finding relief from overcrowding on the Bloor Subway and at the St. George Station. A major investment required for an LRT service on Spadina Avenue is a new bridge over the railway lands south of Front Street. This proposed LRT has been identified for further planning by the TTC as part of a system that connects to the Harbourfront light rail transit service that would serve the Harbourfront, serve the railway

lands, serve the Spadina corridor, and provide future relief from potential overcrowding at St. George Station. Implementation of a Spadina LRT service using articulated streetcars operating in pairs on a three minute headway would increase the capacity of the surface transit system into the downtown by about 5,000 pph, and offer some relief for transit trips originating in the west and north-west. It cannot, however, be expected to offer any significant relief to overcrowding conditions on the Yonge line.

The Express Bus Options

For purposes of this report 'express bus' refers to a bus service operating on exclusive lanes in the direction of travel during peak periods; with limited stops, usually in the order of one kilometer apart except in the Downtown Area. Express bus operation requires the provision of a bus lane in each direction of travel at curbside or in the median of the street, and requires introduction of transit priorities to permit advanced turns and advanced moves by bus traffic. The right-of-way and priority measures typical of that required by a rapid bus operation are similar to the traffic measures that have been put into effect on Eglinton Avenue during rush hour, or on the Allan Road north of Wilson Avenue where exclusive bus lanes have been constructed for the use of bus traffic feeding into the Wilson Avenue Subway station. Recent proposals for a downtown rapid bus service are for a service on Sherbourne and on Don Mills Road.

SHERBOURNE EXPRESS BUS

The Sherbourne bus proposal was first put forward by the Commission in 1982. This express bus service would operate out of the Castle Frank Station south on Sherbourne to the Richmond-Adelaide loop into Downtown. This service would require exclusive north-south bus transit lanes during peak period either at the curbside or in the median on Sherbourne Street. The service would also require the introduction of advanced signals for bus turns and bus moves along the route.

DON MILLS EXPRESS BUS

The express bus on Don Mills was proposed in the Don Valley Corridor Transportation Study report in 1983. This rapid bus service would operate on Don Mills from Finch to the Don Valley Parkway and would follow the Don Valley Parkway from Don Mills Road and into the Downtown via the Richmond and Adelaide loop. This proposal calls for the widening of Don Mills from four to six

DOWNTOWN L.R.T OPTIONS
EXHIBIT 6.1

lanes to provide exclusive bus lanes at the curb, and it proposes that between Don Mills Road and the Richmond-Adelaide loop the rapid bus service operate in mixed traffic on the Don Valley Parkway. The proposal for mixed traffic operation on the Don Valley Parkway assumes that the Parkway will have surplus capacity in this section resulting in part from the proposed extension of Leslie Street. If this extension is not built the rapid bus service could experience traffic congestion and delays on this part of the Don Valley Parkway.

EXPRESS BUS OVERVIEW

Negotiations for a right-of-way for an express bus operating in reserved lanes on Sherbourne have been ongoing between the City of Toronto, Metro and the TTC since 1982. No satisfactory agreement has yet been reached for the right-of-way required for the introduction of this service into the downtown. Without a right-of-way this proposed bus service has virtually no potential for diverting subway trips away from the Yonge Subway. The present trip speed is about 12 kilmeters per hour and this must be doubled to be time competitive with the subway trip.

The Don Mills express bus proposal, with stops at major east-west arterials, offers an express bus service from the suburbs into Downtown Toronto. This service has the advantage that it does not require trade-offs of local street space in favour of suburban trips. Stops could be located at street such as Van Horne, Sheppard, York Mills, Lawrence, Eglinton, Overlea Boulevard, Sherbourne, Church, Yonge, Bay and University to provide a time competitive transit service from Metropolitan Toronto areas north of Highway 401 directly into Downtown. This proposal is now being considered in a feasibility study by the Toronto Transit Commission. Implementation of this service using articulated buses on a three minute headway would increase the capacity of the surface transit system into the downtown by about 1,700 pph.

SURFACE TRANSIT SUMMARY

The surface transit options for relief into downtown are summarized in Exhibit 6.3. Of the five options that have been, and are under consideration, only the Sherbourne and Don Mills express bus proposals provide relief to both the Yonge-University lines into the downtown and the Danforth line from the east. The Sherbourne express bus proposal has been supported by staff of the TTC, however

negative impact on existing street uses has delayed any agreement on dedication of right-of-way for this service. The Don Mills express bus proposal is now being studied by staff of the TTC. Both of these surface transit options may offer measures to relieve overcrowding conditions on the Yonge and University Subways on a short term basis. Their effectiveness will depend upoln the level of service offered and the amount of trip diversion achieved. This effectiveness may be best appraised through a monitored trial operation.

DOWNTOWN EXPRESS BUS ROUTES
EXHIBIT 6.2

EXHIBIT 6.3
SURFACE TRANSIT OPTIONS - SUMMARY

Proposal	Status	Discussion	Potential Relief Capacity pph	
			University Subway	Yonge Subway
Parliament LRT	Proposed by TTC Staff	o Severely negative impact on existing street uses o Exclusive right-of-way not considered available	--	--
Bay LRT	Proposed by City of Toronto Staff	o Requires a grade separated right-of-way o Provides relief to Yonge-University Subway o Will not provide relief to future overcrowding on Bloor-Danforth Subway	5,000±	5,000±
Spadina LRT	Proposed by TTC Staff	o Wide street allowance should provide an available right-ofway o Implementation is dependent upon construction of Spadina Avenue bridge south of Front o Moderately negative impact on existing street uses o Provides potential relief to future overcrowding at St. George Station and on University Subway o Too far west to provide relief to Yonge Subway and Yonge-Bloor Station	5,000	--
Sherborune Express Bus	Proposed by TTC Staff	o Negative impact on existing street uses o Negotiations for exclusive right-of-way during peak periods are uncertain	--	3,600[1]
Don Mills Express Bus	Proposed in Don Valley Transportation Corridor Study	o Articulated bus operation on three minute headway[2] o Feasibility study being conducted by TTC o Probable high operating costs o Minimal negative impact on other street uses	--	1,700

1. From Metro/TTC Rapid Transit Study Report No. 5
2. From Don Valley Corridor Transportation Study

SECTION 7 - THE GO TRANSIT OPTION

History of GO Transit

In May 1967, the Government of Ontario introduced interregional commuter rail service along the Lakeshore corridor from Oakville to Pickering. It was the first provincially sponsored rail service of its kind in Canada and was introduced as an alternative to commuting by automobile. GO Lakeshore rail service was operated for the Ministry (MTC) by Canadian National Railways, under the terms of a ten year agreement.

In its first year of operation, the Lakeshore GO service carried 2,520,000 passengers. Annual ridership on the Lakeshore GO rail service has since grown to 10,796,000 for 1983.

The success of GO Transit in attracting riders brought with it capacity problems in the Lakeshore corridor. The 1976 TTR Report of the Implementation Committee (Master Plan) identified a number of plant improvements necessary to accommodate the needs of the conventional GO Transit system until the year 2001.

This 1976 plan for capacity improvements has been only partially implemented. These improvements have included construction of a grade-separated underpass at the junction of the Oakville and Galt/Weston subdivisions; construction of new GO Transit passenger handling facilities at Union Station, and other rail plant and signal improvements. Total investment in railway improvements since 1967, in 1982 equivalent dollars equals $112 million. Increasing demand for GO service has also led to the introduction of service on the Milton Line to provide some relief to the Oakville-Union Lakeshore service; and the introduction of bi-level cars which almost doubled their carrying capacity without having to introduce more frequent service.

Forecast Demand for Lakeshore Corridor

Demand in the Lakeshore Corridor is primarily work-trip based and centrally oriented. Options for GO Transit were examined in the July 1982 Study "GO Transit Lakeshore Commuter Services - Assessment of System Expansion Alternatives" conducted by DeLCan.

This study states:

- 97% of present trips are destined to the core area of Toronto through Union Station.
- 87% of all existing trips are work trips.
- 64% of current total daily trips occur during the morning and afternoon peak hour.

Existing GO Lakeshore

GO Transit rail service into Downtown Toronto now consists of a total of 25 trains entering Union Station in the peak morning period between 7:00 a.m. and 9:00 a.m., operating on seven different radial lines. Four of these lines serve west and north-west commuter trips, while the remaining three lines serve east and north-east commuters. These services are provided using both single-level and bi-level cars in train lengths that vary up to ten cars. A similar peak period service is offered in the 4:00 p.m. to 6:00 p.m. peak travel period in the evening. Reduced services are offered at other times between approximately 6:00 a.m. and 12:00 p.m.

The total ridership entering Downtown Toronto by GO Transit rail service during the 7:00 a.m. to 9:00 a.m. peak period is typically about 22,000 passengers, with 14,000 from the west and north-west and 8,000 from the east and north-east.

The west commuter trips are served by Lakeshore West and the Milton services. The Lakeshore West service schedules seven trains between 7:00 a.m. and 9:00 a.m., and carries about 8,600 passengers during this two hour period. The Milton service schedules three trains during this same period which carry a total of about 2,200 passengers.

The north-west commuters are served by the Georgetown and Bradford rail services. The Georgetown service schedules four trains in the peak period, carrying a total of about 2,700 commuters, and the Bradford service offers one train carrying approximately 400 passengers.

The east commuter trips are served by the Lakeshore East rail service with six trains scheduled for the peak two hour period, which carry approximately 6,600 passengers into Union Station.

Commuter trips from the north-east are served by the Stouffville service (one train) and the Richmond Hill service (three trains) between 7:00 a.m. and 9:00 a.m. These services carry a total of about 1,600 passengers into Downtown Toronto, with the majority (1,100) using the Richmond Hill service.

The Lakeshore East, Lakeshore West and Milton services all operate on rail lines having two or more tracks. The other four services, Georgetown, Bradford, Richmond Hill and Stouffville, operate on rail lines with single track sections.

Enhanced GO Rail Services

In January 1983, GO Transit requested that CN investigate operational strategies which could be introduced at reasonable cost to address the short term commuter rail capacity problems on the Lakeshore line between Oakville and Pickering.

In May 1983, CN presented GO Transit with a "Terms of Reference" for the proposed Study. This document provided a systematic procedure for developing increased GO train service during the morning and afternoon peak periods (i.e. arrive Union Station 0700-0900; depart Union Station 1600-1800). The "Terms of Reference" also touched on longer term capacity requirements which may be addressed in subsequent phases of the Study. This Study concluded that it was technically feasible to supplement the morning and afternoon peak period Lakeshore (Kingston and Oakville Subdivision) GO schedules by up to three trains in each direction based on greater use of latent track capacity.

EXHIBIT 7.1
Enhanced Lakeshore Peak Point Capacity
(Passengers Per Hour 7:30-8:30 a.m.)

Peak Point		Existing 25% Standees	Enhanced 25% Standees
EASTBOUND	Exhibition-Spadina	10,800	12,960
WESTBOUND	Queen-Union	6,480	8,640

SOURCE: GO Transit

Exhibit 7.1 makes a comparison between existing Lakeshore capacity and potential capacity if the "Enhanced Schedule" is introduced.

In addition to these discussions between GO Rail and CN regarding enhanced services on the Lakeshore line, GO Transit have also studied opportunities for enhanced service on the Richmond Hill, Georgetown and Milton services to meet the potential for growing demand on these rail services.

The GO ALRT Program

GO ALRT is a Government of Ontario (GO) program established to develop and implement Advanced Light Rail Transit (ALRT), serving the regions of Hamilton-Wentworth, Halton, Peel, Durham and Metro Toronto.

In the west, GO ALRT would extend rail commuter service from Oakville to Hamilton and the east from Pickering to Oshawa. In turn, the Oakville to Pickering service would improve.

Overview

The Go Rail Transit service into downtown now serves approximately 17,500 trips during the peak hour of service. In the 20 year period between 1981 and 2001, GO Rail is expected to carry 40% of all new transit trips into the downtown and increase ridership by approximately 80% to 32,000 passengers per hour during the peak a.m. period.

This increase in demand is expected to require service increases on the GO Rail lines that will include ten minute headways on the Lakeshore West and Lakeshore East, and longer and more frequent bi-level trains on the Milton and Richmond Hill Lines.

The Lakeshore East rail service includes a stop at the Danforth Station, which is located approximately 300 metres south of Main Station on the Danforth Subway. This study considered the practicality of diverting some of the Danforth Subway trips to the GO Lakeshore East line as a relief measure to overcrowding on the Yonge-University Subway. In the analysis of this diversion opportunity consideration was given to the following:

1. The 300 metre separation of the two systems is a disincentive to mode to mode transfers even if a covered pedway with moving sidewalk is built to connect the two systems.

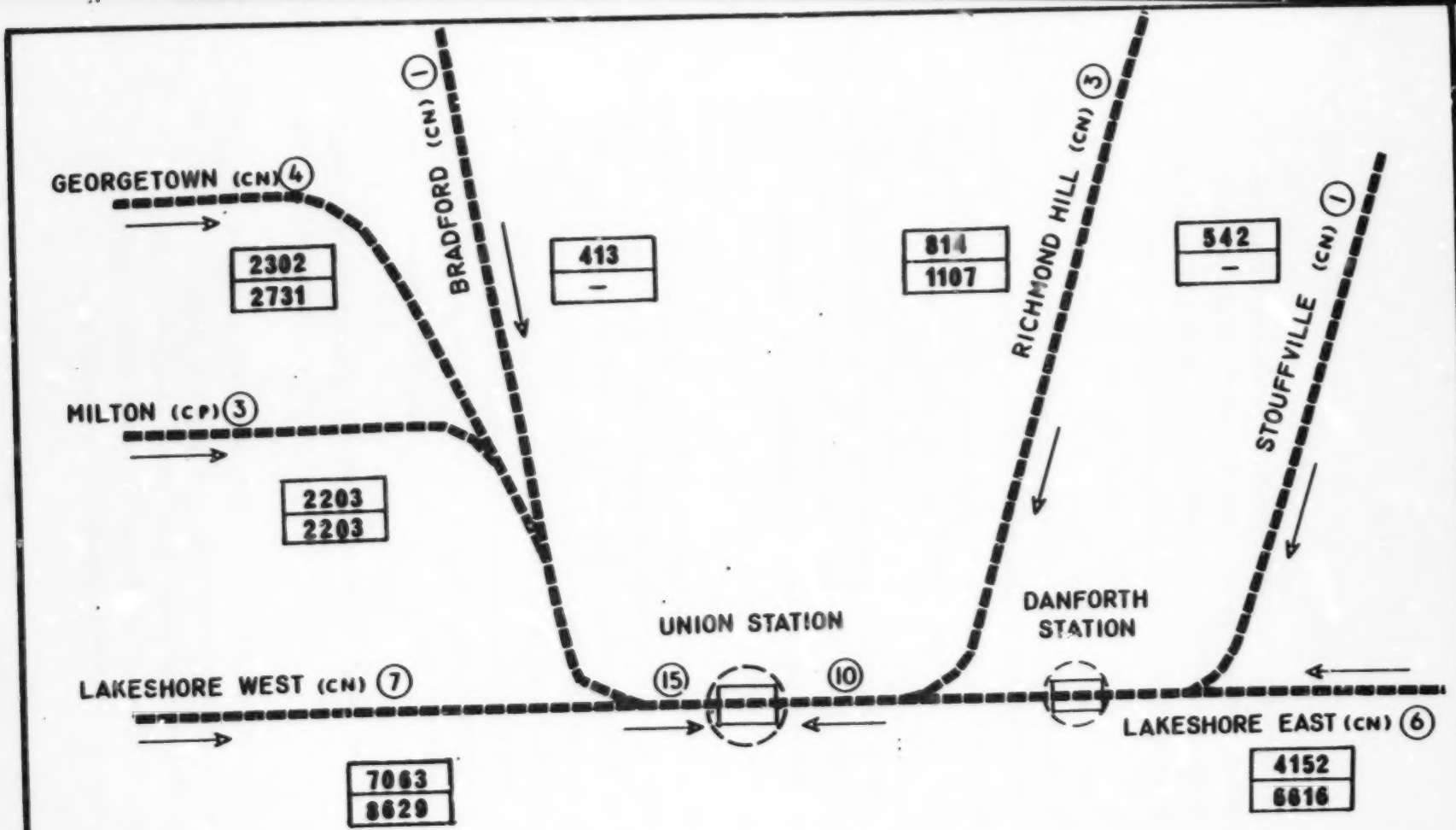
2. The destination of most riders on the Danforth Subway will be north of Front Street within walking distance of a subway station on the Yonge-University Subway. For some of these passengers a transfer to GO Transit at Main Station would require a second transfer to the subway at Union Station. In a 1979 survey GO Transit found that almost 30% of GO Rail passengers transferred to TTC at Union Station.

3. Main Station is ten stations east of the Yonge Subway, and the line loads at this point are only 60% of the peak point loading between Broadview and Yonge Street. The Danforth Subway offers service at a comfortable Level C on this section of the line, with over 50% of the passengers having an available seat. At this level of service there is less incentive to make a mode to mode transfer.

4. The existing fare structure acts as a disincentive.

5. Forecast ridership growth on the Lakeshore line of GO Rail from its existing catchment area along the Lakeshore will require service and capacity improvements without considering additional demand due to trip diversion from the subway. It is probable that any significant diversion from the subway to the GO Rail service would require an upgraded rail transit service such as the proposed GO ALRT program.

In view of the foregoing the GO Rail service is not considered to offer any significant relief from overcrowding on the Yonge-University Subway. While an upgraded rail service such as GO ALRT may offer greater capacity into the downtown, the weakness of the connection at Main Station (long transfer distance and located too far east), and the poor accessibility to the downtown office locations (30% may require a transfer back to TTC), limit the opportunities for diverting downtown trips from the Danforth Subway to the Lakeshore East GO Rail service.



1. (7) NUMBER OF TRAINS SCHEDULED BETWEEN 7:00 am & 9:00 am

2.

PEAK HOUR
PEAK PERIOD 7 – 9 am

GO TRANSIT RAIL SERVICE RIDERSHIP

EXHIBIT 7.2

SECTION 8 - CHOICES

Since 1974 the Yonge Subway has been operating in the Level of Service E Zone and on three occasions (1974, 1975 and 1981) carried loads in the Level F Zone. Peak period loading on the Yonge Subway in 1974 reached approximately 34,500 and then declined with the downturn in the economy and the opening of the Spadina Subway.

From 1978 to 1981 ridership again grew on the Yonge Subway reaching approximately 35,000 pph in 1981. Since 1981 the decline in the economy has led to a corresponding decline in peak period ridership into the downtown and service is now again operating in the Level of Service E Zone.

In 1974 the University Subway was carrying approximately 15,000 passengers per hour in the peak period, and providing service in the Level B Zone. Since 1974 ridership has increased to about 24,000 passengers per hour and the service is now at Level C.

Forecasts of increased ridership on the Yonge-University Subway into the downtown indicates that the Level of Service on both lines will be in the Level of Service E Zone by the late 1980's, and be in the Level of Service F Zone by the mid 1990's. A Level of Service F operation has never been sustained for any extended period of time on the existing subway, and under these loads the crowd conditions on platforms and on board cars cause extended stops at station platforms. These extended dwell times result in fewer trains getting through the station and an overall reduction in line capacity.

These ridership forecasts for the Yonge-University Subway have been built upon four key assumptions:

1. Whereas approximately 50% of Metro Region office development over the past twenty years has located in the downtown; it is assumed that only 20% to 40% will choose a downtown location over the next 20 years. Major projects such as the Railway Lands, have been assumed to result in a transfer of office development within the downtown, rather than an

attraction of development from other sections of the Metropolitan Region.

2. The GO Transit share of transit trips into downtown will increase. Whereas GO Transit carried 20% of the growth in transit trips into downtown over the past twelve years; it is assumed that this will double to 40% of all additional transit trips over the next twenty years. This assumption reflects on expected predominant growth in residential population outside Metropolitan Toronto.

3. Variable work programs will be effective in reducing the peaking of peak period ridership. Approximately 62% of today's a.m. subway work trips are made in the peak hour, and the forecasts of ridership assume that continued promotional programs will be effective in reducing this peaking factor.

4. Growth in ridership into the downtown will be diverted to the University Subway until loads are balanced on the Yonge and University Subways. Background Report No. 2 of the 1982 Metro/TTC Rapid Transit Study predicted that this balanced loading may not be achievable. This report assumes a continued promotional program by TTC to encourage use of this line and a passenger capacity at the St. George Station to adequately accommodate the increased transfer traffic.

   Transfer traffic at St. George is already greater than transfer traffic at Yonge-Bloor, and although Yonge-Bloor is regarded as the critical station today; the crowd conditions of St. George should be a subject of careful observation by TTC as this transfer traffic continues to grow. A failure to achieve this balanced loading, or a failure at the St. George Station to safely accommodate the increased traffic would indicate an earlier need for relief measures.

Section 2 of this report refers to five issues to be addressed in this study. The issues are discussed in Section 3 through to Section 7, and can be summarized as follows:

1. **Future Transportation Needs**

Despite a declining rate of growth in labour force, structural changes in the economy over the next twenty years are expected to maintain a strong growth rate in office employment in the Metro Region. Much of this new employment is expected to locate outside downtown Toronto; however, the office employment that will choose a downtown location is still expected to cause overloading of the existing transportation system by the early to mid 90's. (Refer to Section 3).

2. **Existing Subway Capacity**

More frequent trains operating on the Yonge Subway, platform boarding times at Yonge-Bloor and crowding conditions in the Yonge-Bloor Station were analyzed and there is no practical means of achieving more than a marginal increase in the line capacity of the Yonge-University Subway. A reserve capacity of about 10,000 pph now exists on the University line which may meet the expected growth until the early to mid 1990's if balanced loading can be achieved on both subways. Beyond the early 1990's forecast growth will cause Level F congestion on a frequent basis. The increasing volume of transfer traffic at the St. George Station may require the introduction of restrictive crowd control measures in the late 1980's to assist in maintaining passenger safety. (Refer to Section 4).

3. **Surface Transit Options**

Express bus or LRT into downtown on streets such as Don Mills, Parliament, Sherbourne, Bay, or Spadina requires the dedication of two lanes to transit, which are now being used for local traffic and/or parking. The availability of right-of-way for these surface transit options is uncertain.

An express bus service on Don Mills and/or Sherbourne would provide additional capacity into downtown that may be effective in diverting ridership from the subway, and reduce the level of crowding over a short term period. This type of service is a short term solution that may accommodate the expected growth in demand over a two to four year period depending upon effectiveness in diverting trips from the subway.

An LRT service on Spadina would relieve anticipated future congestion at St. George Station and on the Bloor Subway. The line would be too far west to provide relief at Yonge-Bloor. This LRT service may offer relief on an intermediate time frame when overloading of the University Subway from trips originating from the west and north-west become a problem.

A proposed Bay LRT is practical only if grade separated with costs comparable to a rapid transit line, and must be considered in the context of other similarly costed solutions such as the Downtown Relief Line. (Refer to Section 6).

4. Go Transit Option

Over the next two decades growth in office employment is expected to be due to structural changes in the economy, and due to growth in the labour force. Most downtown office employment generated by structural changes will be drawn from residents inside Metro and increase demand on the TTC subway and surface system; whereas most growth in the labour force will occur outside Metro, and correspondingly increase demand for service on GO Rail, GO Bus, Mississauga Transit and Markham Transit. The growth in ridership on GO Rail is expected to require ten minute service on both the Lakeshore East and Lakeshore West, and increased service on the Richmond Hill and Milton lines. The Lakeshore East GO Rail service is not expected to be effective in providing relief from overcrowding from the Danforth and Yonge Subway lines. (Refer to Section 6).

5. The Do Nothing Option

The total area of downtown office space that is either vacant or under construction, has the potential to house up to 35,000 additional downtown office employees. This would add a demand of as much as 10,000 new passengers on the subway during the A.M. peak hour. This increase in ridership would result in a level of service on both the Yonge and University Subways in the upper range of Level of Service E and lower range of Level of Service F. Any development approval further to projects already under construction without public investment in complementary transportation facilities will cause further deterioration in the level of service available for work trips into the downtown. By the late 1980's, the ridership on the

University Subway is expected to be comparable to today's ridership on the Yonge Subway, and beyond that crowding on both lines will increase. By the mid 1990's demand is expected to have reached Level of Service F on both lines and capacity will actually start to decline as crowding causes increased train and system delays.

The next decade is expected to be a time of transition with many structural changes in employment in the Metro Region. These changes are expected to result in an increased proportion of office employment throughout the Metro Region, and despite a declining growth rate in the overall labour force, a strong job market in office employment is expected to continue.

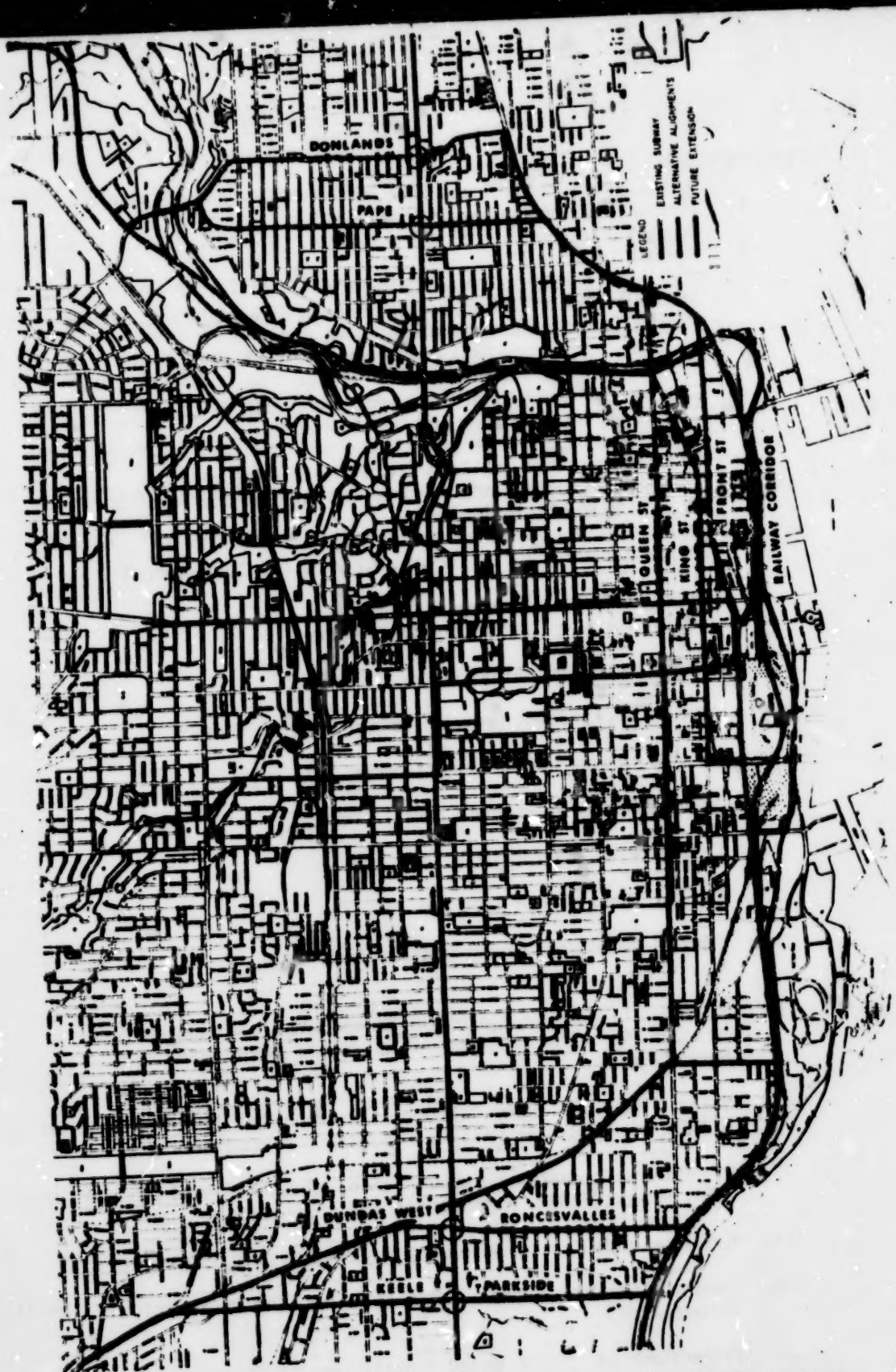
Although more of this office employment is expected to locate outside the downtown, a strong growth in downtown office employment is forecast to continue. The existing vacant downtown office space, and space presently under construction, is a visible indication of the potential for employment growth in downtown offices. This space alone could add 35,000 new employees downtown, and 10,000 new riders on the subway.

The issues in transit are a question of the quality of accessibility that should be maintained into the downtown. Ten years ago the Yonge and University Subways operated with a residual capacity of about 20,000 pph during the peak hour of operation. Approximately one half of this residual capacity has been used to meet the growth in demand in the past decade and, assuming that most additional ridership will choose the University Subway, the remaining residual capacity may meet demand for up to the next ten years. Beyond that, if a new rapid transit line is not built the quality of accessibility into downtown will show marked deterioration as work trips into downtown either shift to surface routes, to private cars, or spread over a greater peak travel period.

The second phase of this study will consider alignment options for a rapid transit line through the downtown, ranging from Queen Street in the north to the proposed Esplanade West in the south. The line as proposed would connect the downtown core to the Danforth Subway at either Pape or Donlands Station providing an alternative rapid transit routing into the downtown. The purpose of this line would be to divert some of the transfer traffic from Yonge-Bloor Station to Pape or

Donlands Station; to reduce demand on the Yonge Subway south of Bloor, and to reduce demand on the Danforth Subway east of Yonge. Exhibit 8.1 illustrates the options being studied and that should be considered for implementation if accessibility into downtown is to be maintained.

This study has examined the question of growth in transportation needs into the downtown using three different methods, and has drawn fairly consistent conclusions from all three methods. While the timing may vary with economic conditions and business locational decisions, there is solid evidence of a growing need to construct more rapid transit into the downtown. Surface transit improvements and increased patronage on the GO Rail Service may offer limited relief from overcrowding and an improvement in the level of service over a limited period of time. However service capacity shortfalls apppear most probable by the early to mid 1990's if a relief line is not implemented over the next seven to ten years.



D.R.T. ALIGNMENT OPTIONS
EXHIBIT 8.1

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